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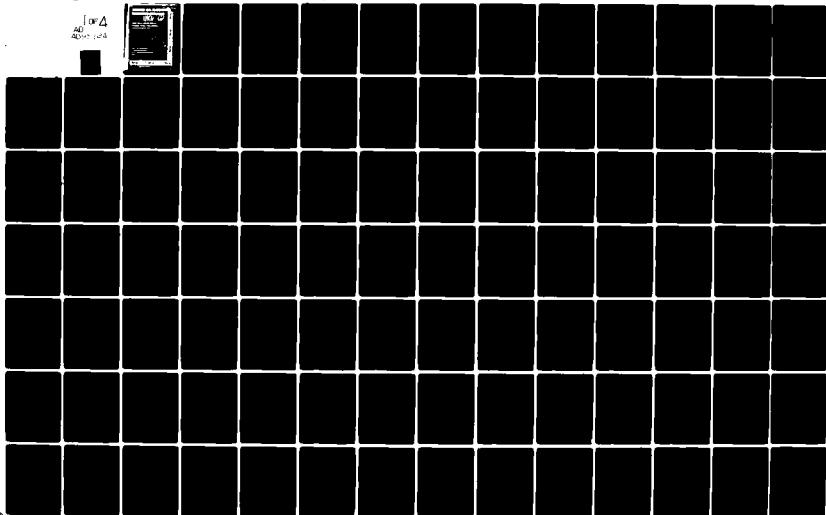
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AGRARIAN STRUCTURE AND LABOR MIGRATION
IN RURAL MEXICO: THE CASE OF CIRCULAR
MIGRATION OF UNDOCUMENTED WORKERS
TO THE U.S.

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by
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July 1980

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Institute of Latin American Studies
The University of Texas at Austin

and

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Mexico City

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AGRARIAN STRUCTURE AND LABOR MIGRATION
IN RURAL MEXICO: THE CASE OF CIRCULAR MIGRATION
OF UNDOCUMENTED WORKERS TO THE U.S.

Kenneth David Roberts

The purpose of this study is to determine the specific agricultural conditions in Mexico which cause off-farm wage labor to take the form of undocumented migration to the United States. A model is developed which focuses upon regional patterns of labor allocation by the rural household, and the determinants of household farm income, farm labor, and off-farm labor. Together these variables and a strategy of risk-minimization by the peasant household determine the allocation of household labor to different off-farm occupations, of which migration to the United States is only one alternative.

The relationships developed in the model are examined empirically in four rural areas of Mexico: Las Huastecas, San Luis Potosí, the Mixteca Baja, Oaxaca; Valsequillo, Puebla, and the Bajío, Guanajuato. The principal conclusion to emerge from this research is that regional agricultural development will not necessarily stem the flow of migratory wage labor to the United States. The Bajío, which contributed most heavily to the U.S. migration stream, was the most developed of the four zones studied, and within this zone there were no significant differences between migrant and non-migrant households with respect to most economic indicators.

Migrant households, however, were found to be significantly larger through the incorporation of more adult members into the extended family. Higher farm incomes in that zone permit more individuals to claim a share of farm production, while lower farm labor requirements and higher cash outlays dictate that the majority of labor by these members will be in off-farm occupations. This household structure encourages U.S. migration by allowing the higher level of risk associated with this activity to be partially offset through occupational diversification. Migration in the poorest region, by contrast, largely involves a permanent move to an urban locale in Mexico, because the low farm incomes could not support riskier alternatives involving circular migration.

When migrants have the opportunity to respond to their self-interests, the predominant reason people migrate in peaceful times is to improve their human conditions. The vast immigration to the United States was primarily a response to better economic opportunities as the migrants perceived these opportunities.

Theodore Schultz (1978)

Would anyone dare to 'explain' the migration from Europe towards North America in the nineteenth century as having been caused by the motivations of migrants with reference to differences between potential incomes, without pointing out that the migrants were peasants who had been driven from their lands by the development of agrarian capitalism, starting in England in the seventeenth and eighteenth century with the enclosure acts, and then embracing central and eastern Europe in the nineteenth century, or without adding that the French agrarian revolution, by creating a secure farming peasantry, limited the rural exodus from that country...? Would anyone dare to explain these migrations by the strong migratory urges of the Irish, the Germans, the Portuguese or the Italians, and the weak ones of the French! The significant fact considered here is not the tautological evidence of the divergence of potential incomes, but the transformation of the socio-economic organization of the rural world which has forced the exodus of a part of its population.

Samir Amin (1974)

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CHAPTER I

STUDY PURPOSES AND LIMITATIONS

This study concerns the farm labor and off-farm wage labor of rural landholding households in four zones of Mexico. Its original scope was considerably more narrow, focusing instead upon the "push factors" affecting undocumented migration from rural Mexico to the United States. However, it soon became apparent that restricting the analysis to U.S. migration would make it impossible to distinguish between factors which cause households to work off-farm in general, and those which condition this wage-labor to take the form of migration to the United States.

The starting point for the theoretical and empirical analysis is the regional specificity of areas in Mexico which send large numbers of migrants to the United States. Having broadened the scope of this study to include a variety of potential patterns of household labor allocation, the regional specificity of the particular labor pattern which includes U.S. migration makes it necessary to investigate both sending and non-sending areas. Were non-sending areas excluded from the analysis, no determination could be made of the factors which cause people from certain zones to migrate to the U.S. while those from other zones do not. Factors in a sending area which distinguish between migrants and non-migrants cannot be generalized across households in different

regions of Mexico. For instance, if migrants in a sending area were found to be relatively poorer than non-migrants, it cannot be concluded that it is the poorer Mexican households which engage in U.S. migration.

To make these interregional differences explicit, four rural zones in Mexico were chosen for analysis, only one of which (the Bajío) was known to be a region of high migration to the United States. The other three regions were chosen to represent various types of peasant agriculture found in Mexico. An extremely poor region of Oaxaca was selected to represent the low end of the rural socioeconomic spectrum of Mexico, and to determine the influence of the indigenous culture found on that region upon patterns of labor allocation. Another relatively indigenous zone chosen is located in San Luis Potosí, a state close to the U.S. and known to send a relatively large number of migrants to the U.S. A densely populated area in Puebla was selected to represent a typical type of irrigated agriculture encountered on the Central Plateau, and the influence of a wider variety of local wage-labor opportunities. Migration to the United States was not undertaken by any of the households surveyed in these three regions, yet off-farm wage labor was important in all zones. These three zones provide an ideal contrast to the Bajío, in which a number of U.S. migrant households were encountered. The factors which cause patterns of labor allocation to differ among zones can be explicitly

investigated by this method, providing the basis for the formulation of viable options to U.S. migration.

The data examined in these four zones was collected for purposes other than the study of migration. The Bajío data was collected by the author and others in 1974 as part of a study of agricultural change over the preceding twenty years, and particularly of the effect of technological change upon farm employment. The other three zones were part of a study of agricultural employment in six zones of Mexico undertaken by the Centro de Investigaciones Agrárias. The study purposes and methods employed in these surveys and the data extracted from them for purposes of this study are reviewed in the appendix. The design of both of these surveys for other purposes is the main empirical limitation of this study, but their focus upon employment makes the data suitable for examination of patterns of labor allocation.

Moreover, although the choice of zones was limited to these seven for which adequate data was available, these zones were different enough to represent the major types of agriculture practiced in Mexico. The three zones eliminated were the coast of Hermosillo, a region in Toluca, and an area in Veracruz. Hermosillo has never been a zone of peasant agriculture, the data in Toluca was inadequate, and Veracruz is somewhat similar to the area studied in San Luis Potosí, though the latter is much closer to the United States. The four zones which remain are similar in that the majority of

households in each are peasant households, while the regions themselves exhibit different levels of economic and cultural integration into the Mexican mainstream, and agriculture varies from slash-and-burn corn production to highly mechanized wheat cultivation.

The analysis in the four empirical chapters and the conclusions which follow are based upon a model of labor allocation of peasant households developed in the third part of Chapter II. The first two parts of that chapter contain a review and assessment of the two major views of the process of undocumented migration and develop the level and unit of analysis that is employed in the rest of the study. The reader with more pragmatic interests may wish to proceed directly to the section on model development.

CHAPTER II

THEORETICAL APPROACHES TO LABOR MIGRATION IN LESS DEVELOPED COUNTRIES

1. UNDOCUMENTED LABOR MIGRATION FROM MEXICO TO THE UNITED STATES: THEORY AND REALITY

1.1 A Profile of the Undocumented Mexican Worker

There are few issues where the gap between what is known and what needs to be known for the formulation of public policy is as large as that concerning the issue of undocumented migration of Mexicans to the United States. In the mid-1970's, social scientists were confronted with estimates of the number of undocumented migrants ranging up to twelve million persons, and were unable to assess the validity of these estimates because they lacked the necessary data. The first step in a program of research was clearly to examine the major dimensions of this migration stream.

We are now reaching the culmination of this first stage of research. Most of what is known so far comes from surveys of apprehended aliens or migrants in their community of origin. Data from each of these samples contains certain biases, but these are somewhat counterbalanced by the consistency of the portrait which emerges. This portrait is that of a young male between the ages of 18 and 35, unskilled, poorly educated and predominantly from a rural region, although there is some evidence of a shift in composition towards more urban migrants (North and Houstoun, 1976; Cárdenas, 1978; Cornelius, 1978; Avante

Systems, 1978). More important for policy consequences, this migration is overwhelmingly temporary in nature, involving rapid entry into the labor force and few demands upon social services. While certain dimensions of this stylized portrait may come to be seen as oversimplifications in light of the forthcoming results of a large-scale Mexican household survey (Bustamente, 1978) and other research, the basic features of the rural component of this stream are not expected to change dramatically, nor the absolute magnitude of that stream.

This simple profile has been effective in destroying a number of misconceptions about the migration process. It is definitely not permanent migration, which was the implicit assumption underlying the inflated estimates of the magnitude of the Mexican undocumented alien population produced by Lesko Associates (1975). Cornelius (1977) found that the average duration of stay of migrants from rural Jalisco was between six and eight months. Bustamente (1978) found only 13.7 percent of a sample of 3,689 Mexicans surveyed after release by the Immigration and Naturalization Service (INS) had remained in the United States for a full year. In addition, lack of industrial skills and English, combined with an illegal status, relegate the undocumented Mexican migrant to positions in the secondary labor market. He does not appear to compete directly with the majority of the domestic labor force, although the effect upon minority employment is still debated (King, n.d.).

Research at this stage has thus served the important function of delineating some major parameters of the migration stream, and has thereby provided a much more rational environment for discussion than had previously existed.

But what is equally evident from this profile is that an understanding of the causes of migration to the U.S. is now a paramount research priority, for the stylized profile of the rural migrant fits a large portion of the rural Mexican labor force. Migrants to the United States have been found to be either landless or to possess small plots of land cultivated in subsistence plots with traditional techniques; to be poor but not necessarily from the poorest strata of the community; and to have restricted wage-labor opportunities in their home community (Cornelius and Díaz-Canedo, 1976; Wiest, 1970; Dinerman, 1978). In broad terms, this description fits a large percentage of the rural population in most parts of Mexico where agriculture is practiced. Yet available data indicate that most migrants to the U.S. come from only a few of the central and border Mexican states, and that even within these states migration is significantly heavier from some regions and communities than others (Dagodag, 1975; North and Houston, 1976; Bustamente, 1977). The factors which cause rural Mexicans from some regions to come to the United States, while those who share similar characteristics in other regions engage in types of wage-labor involving different spatial patterns,

have yet to be examined. Lacking a unique set of characteristics which can identify potential migrants from rural areas, it becomes difficult to predict changes in the parameters of the process, such as intensity and duration of stay, as rural conditions change. It is also impossible to formulate policies which would alter the process, if such an alteration were deemed desirable.

The data which are needed at this stage do not, however, exist independent of theory. The theoretical framework which is employed not only determines the variables which are selected as critical, but also the units to which these variables pertain and the very definition of the process which is being explained. Research at the first stage accomplished its goal by exposing a set of "stylized facts"; we must now use these facts and an understanding of similar or analogous social processes to both formulate and test a theory with relevant data.

The goal of this chapter is to provide the theoretical framework within which data from rural zones of Mexico can be analyzed. The first step in this formulation is to critically examine the alternative theoretical approaches that have been applied to the process. It will be shown that these approaches do not explain several of the salient dimensions of this process, and that a clearer understanding of conditions in rural Mexico is necessary to formulate an appropriate theory.

1.2 Theoretical Approaches to Migration from Rural Agriculture

Recent research which either investigates or makes assumptions about the causes of Mexican migration to the U.S. has usually adopted one of two major theoretical approaches. The first is the so-called "push/pull hypothesis", which sees migration to the U.S. as the result of an interplay of "push factors" operating within Mexico and "pull factors" attracting migrants to the United States. The second major approach sees the migration phenomenon as the result of the interrelationships between the two economic systems and as a natural part of their historic development. This approach has been termed "the historical-structural approach."

While some similarities exist between these approaches, their differences are manifested within political discussions of the issue. The "push/pull" hypothesis is often adopted by those who tend to see migration as a "problem" to be solved. Because it is unlikely (and undesirable from the point of view of the U.S.) that the attractiveness of basic pull factors such as higher wages and employment should lessen, the solution to the problem lies in ameliorating the intensity of the push factors operating in Mexico. Proposals include reducing the birth rate to reduce population pressure on the land, increasing agricultural productivity to raise rural incomes, and increasing employment opportunities in other sectors of the economy to provide

alternative migration destinations within Mexico.

The political manifestation of the structuralist viewpoint, on the other hand, is that it is no "problem" at all -- that its causes lie in the historical relationship of dependency of Mexico upon the U.S., and in the deliberate manipulation of immigration policy by the U.S. to respond to cyclical changes in domestic labor force requirements since the middle of the last century (Bach, 1978; Jenkins, 1978). The capitalist economies of both countries are seen as benefiting by the process of migration: that in the U.S. by obtaining a cheap supply of labor, and that in Mexico by maintaining a politically stable labor reserve subsidized by migration earnings for expansion of the agricultural and industrial economy. If a "solution" is sought, it is in terms of a major transformation of the relationship between Mexico and the U.S., and between sectors and classes within Mexico.

1.2.1 The Push/Pull Model of Migration

Given the large absolute difference that has been maintained between U.S. and Mexican wage rates, the push/pull model has tended to focus upon the push factors operating in the Mexican agricultural sector. Rochin provides an example of the traditional explanation: "The socioeconomic conditions in Mexico leave few alternatives for Mexicans but to migrate: in a way they are 'pushed' from Mexico because of the shortage of wage-earning

opportunities, an impoverished economic situation and a distribution of income which is sharply skewed" (1977: 156).

The Mexican agricultural sector is typically seen as stagnant and coexisting alongside an industrial or modern agricultural sector. The usual explanation of this dichotomy is that the expansion of these sectors is insufficient to absorb the increasing numbers of workers available from traditional agriculture. A recent article explains that immigration to the U.S. from the agricultural sector of Mexico is due to "economic dualism, in which the expanding modern sectors exist side by side with lagging traditional sectors", and in which "surplus workers are accumulating in the hinterlands of agriculture, industry and services" (Rubens, 1978: 11). Mexican workers in the traditional sector are seen as "waiting" for opportunities to become available for permanent migration within Mexico. What is presented is thus a variant of the traditional push/pull model, in which push factors are effectively operating within the rural sector, but there is no offsetting pull from the urban areas of Mexico. The result is migration to the United States.

The push/pull model links the decisions of the individual migrant, who responds to positive and negative factors at origin and destination, to the macroeconomic conditions in the national economy which cause these factors to move in one direction or the other. Factors operating at the macroeconomic level cause responses in individuals with different characteristics, so that

both of the important questions -- who migrates and why they migrate -- can be addressed within this framework.

This merging of the macro and micro model, however, is relatively recent. The micro model of migration emerged from a reformulation of Lee's (1969) analysis, while the macro model traces its development from Lewis' (1954) model of the dual economy. As we shall see, the power of the merged model to explain factors important at both levels of analysis, the micro and macro, stems from its implicit reliance upon a neo-classical view of the relations governing production and distribution.

Lee presents what has been called "the most appealing and most concise 'general', non-rigorous framework for analyzing the internal migration process" (Todaro, 1976). It focuses upon the spatial aspects of migration -- place of origin, destination, and intervening obstacles -- and upon individuals in these places. General factors such as wages and employment will result in general directions of magnitude in the migration flows, but these factors operate upon persons who weigh them according to their individual attributes (education, skills, race, etc.) and their perceptions. The total migration flow is the aggregate of individuals who respond to these factors in a similar manner.

The generality of Lee's model has been replaced in current literature by a more explicit formulation of the costs

and benefits of migration to the individual. Individuals embody different quantities of "human capital," depending upon their education and skill level, and migrate to maximize economic returns on this capital. Barnum and Sabot regard this approach as both more general and more rigorous than the simple push/pull model (1976: 16):

the approach that divides factors influencing the decision to migrate into those that "push" individuals out of the rural area and those that "pull" them into the urban areas is frequently only a crude version of human capital theory. To say that push factors...are strong is roughly equivalent to stating that the opportunity costs of migration are low.

Representative applications of this theory are reviewed in Yap (1977) and Brigg (1975).

To this point the development of the push/pull model at the level of the individual migrant has been emphasized. Parallel with this development a comparable theory of migration at the level of the national economy was emerging. Within this theory, migration was seen as a key process in the allocation of surplus labor from agriculture to more productive jobs in the city, and so was inseparable from the process of economic development and modernization. These mainstreams of migration theory have merged to form two sides of the same coin, one focusing upon macro processes, the other upon micro responses. What I have loosely called "push/pull model" is the result of that union.

The key feature of the macro model is that migration is

the mobility of one of the central factors of production, labor, and that it is therefore an endogenously determined adjustment mechanism. While many interesting twists have been introduced, all models of this type can trace their lineage to the basic dual-economy model of Lewis (1954). This model considers an economy that is composed of a rural agricultural and an urban industrial sector. There exists surplus labor in the agricultural sector, and an urban wage set at a fixed premium above the level of rural subsistence. Capital accumulation in the urban sector provides the driving force of the model, providing jobs that attract rural migrants as these jobs become available. The agricultural sector within this model has two major functions, to provide cheap agricultural products and to provide labor to a growing urban sector. Ricardo and the classical economists emphasized the commodity function; dual-economy theorists have focused upon the labor function. Yotopoulos summarizes: "Agriculture was thought to play the role of 'Custodian of the National Fund' (labor). It was assumed that the sector had for some time employed the resources available to it at the wrong factor intensities" (1977: 30).

The model of the dual economy has been integrated by Zarembka (1972) and others into a two-sector, neoclassical, general equilibrium framework, although usually retaining unique characteristics in one sector or the other which impede the

efficient operation of the market forces. The two sectors are usually assumed to have an endowment of "factors of production" -- capital, labor and land -- which are initially different. These regional endowments determine the prices which the factors receive in the form of profits, wages, and rents according to their relative marginal productivities. A higher quantity of a factor implies a lower marginal productivity, and hence lower price.

This theoretical framework is explicit in Greenwood's recent study of Mexican migration; "because the labor-capital ratio is relatively high in L (the low-wage region) and relatively low in H (the high-wage region), the rate of return on capital tends to be relatively high in the low-wage region and relatively low in the high-wage region" (1978: 19). Research which relates migration from rural areas to "population pressure" on the land also usually relies upon this neoclassical relationship, either implicitly as by Unikel et al. (1973), or explicitly, as by King, when he states "density is usually interpreted as a proxy for the marginal product of labor on the land and is taken to be inversely related to the wage rate in the rural sector of the state" (1978: 91).

Within this framework migration is factor mobility, and factor mobility changes relative sectoral quantities of the factors of production and thereby tends to equalize relative factor prices. Thus, "migration leads to an equilibrium in

which labor is used efficiently and serves to promote an equal distribution of wages between urban and rural locations (Lucas, 1977: 39).

The attainment of equilibrium implies a situation in which significant income differences between the rural and urban sectors are eliminated and "social welfare" is maximized. The reality in most of the Third World is obviously far from that equilibrium: capital/labor ratios have not tended to equalize between agriculture and industry, technology in industry and in commercial agriculture appears to be too capital-intensive for the high labor/land and labor/capital ratios, and rural to urban migration continues despite high rates of urban unemployment. Because the theoretical model under neoclassical assumptions predicts a different set of results, these distortions are usually explained outside the model by institutional impediments to the proper functioning of the relevant markets.

Rural sector distortions were basic to early formulations of the theory of the dual economy, for the existence of surplus labor in agriculture implies something other than the competitive labor market assumption found in most economic analyses. A debate on the necessary conditions for the existence of surplus labor in the rural sector eventually led to the formulation of a theory of a peasant economy in which the labor-leisure trade-off of the peasant producer was central (Sen, 1966; Nakajima, 1969; Fisk, 1975). The peasant worked and earned less because

his preference-function differed from that of the capitalist producer.

But it was Todaro's (1969) treatment of urban sector distortions which had the major impact upon the theory of labor migration in the dual economy. Todaro's model, based upon the idea that migrants respond to differences in expected income and that an artificially high wage exists in urban areas of less-developed countries, provides a concise explanation for the existence of migration to areas of high urban unemployment. A sufficient condition for rural-urban migration is that the urban wage multiplied by the probability of finding an urban job exceeds rural income. The Todaro model was subsequently extended by inserting this formulation of the individual migrant's decision process into a generalized dual economy model, with urban and rural incomes endogenously determined by relative quantities of the basic factors of production (Harris and Todaro, 1970).

The comprehensiveness of what I have loosely called the "push/pull model", and which may more accurately be called the neoclassical expected-income model, is now apparent. It embraces both the level of the individual migrant and the level of the national economy; the former by examining variables which affect the decision to migrate, such as the magnitude of wage differentials between sectors, unemployment, age, and sex, and the latter by examining the macroeconomic factors which determine the relative

magnitudes of these variables in the two sectors. It is a powerful and widely accepted model. Todaro concludes, "the idea that migration proceeds primarily in response to differences in 'expected' urban and rural real incomes...remains widely accepted to this day as the 'received theory' in the literature on migration and economic development" (1976: 45).

Because of its applicability to the analysis of both individual migration decisions and to aggregate flow of migrants between two points, empirical investigations employing the neo-classical expected-income model can draw variables from both levels of analysis. Jenkin's (1977) study of Mexican migration to the United States is representative of the empirical application of the *push/pull model*. The dependent variable is yearly apprehensions of undocumented Mexicans by the INS, an index replete with problems when used as a surrogate for the flow of illegal immigrants (Roberts et al., 1978). Independent variables are divided into push and pull factors: push factors are Mexican agricultural wages, commodity prices, agricultural productivity, and agricultural investment; pull factors are the corresponding variables in the United States, including agricultural employment rates. This formulation clearly incorporates variables applicable at the individual level of analysis, such as relative wages and employment, and at the level of the economy, such as agricultural productivity and capital investment. Other studies of migration to the United States adopting a similar framework

and methodology are those by Frisbie (1975) and Blejer et al. (1977). Unikel et al. (1973) also utilize this basic perspective when examining the effect of demographic pressure, manifested in rural land/labor ratios, upon internal migration in Mexico.

The policy implications stemming from application of the neoclassical expected income hypothesis to situations of internal or international migration follow directly from the internal logic of the model. If migration is seen as a social problem leading to high rates of urban unemployment, inadequate provision of social services for the migrant population, lowered potential for agricultural development, or any of the other consequences attributed to the process, then there must exist distortions in the basic economic relationships which are causing this theoretically equilibrating process to have negative consequences.

Since the theoretical basis of the relationship between relative factor prices is not often questioned, anomalies presented by the empirical evidence can only be resolved at the empirical level. It is held that the relative supply of factors of production is not being correctly translated through the market system, so that producers are led astray in their choice of factor proportions. The market is not functioning properly, and the inappropriate allocation of factors of production is due to factor price distortions (Rossner, 1974). The culprits most

commonly causing these distortions are said to be government and labor unions. In the Todaro model, the existence of rural to urban migration in the face of urban unemployment is the result of an institutionalized wage in the urban sector. Lucas concludes, "the sole source of this inefficiency is a minimum wage, and the first-best policy is clearly removal of this rigidity" (1977: 50). Or if labor costs are not considered to be too high, capital costs, subsidized by government policies, are considered to be too low. A review article on development policy appearing in a major American economic journal concluded, "In general it may be said that the main reason for development having proceeded along capital intensive lines lies in the import substitution policies adopted" (Healy, 1972: 773).

In addition to market impediments introduced by government and unions, the process of factor-price equalization in the rural areas is said to be thwarted as a result of vestiges of traditional agriculture (Schultz, 1964). Specifically, communal and other forms of property rights impede the proper functioning of commodity and factor markets, so that the establishment of individual property rights becomes a necessary condition for maximization of social welfare (Bhagwati and Srinivasan, 1974). The very process of modernization and capitalist development tends to remove this impediment, correcting the distortion in relative factor prices and allowing development to proceed even faster. This allows transition from a low "stage" of

economic development to a phase of rapid growth like that envisioned by Rostow (1966). The application of capital to agriculture implied by modernization, according to this theory, also raises the relative return of labor in the agricultural sector, and tends to equalize relative factor supplies between the agricultural and industrial sectors. In addition to labor flowing from the agricultural to the industrial sector, capital flows from the industrial to the agricultural sector (Corden and Findlay, 1975). This alternative finds its popular expression in current policy recommendations for large-scale agricultural development programs within the Mexican rural sector to stem the flow of undocumented migrants.

1.2.2 The Historical-Structural Approach to Migration

The historical-structural approach to internal and international migration is relatively new, and only recently have some of the key concepts been subjected to systematic analysis. The CLACSO studies of internal migration in Latin America (Singer, 1972; Balán, 1974) were the first to consider explicitly the role of structural relations and to thereby differentiate this approach from more traditional analyses.

These studies and others start with the assumption that regional and international relations involve various degrees of dependency between the capitalist metropolis and the satellite region. Underdevelopment in the satellite region is seen as

determined by the penetration of capitalist relations of production. Migration between satellite regions and the metropolis, whether internal or international, is considered to be an integral part of the structural relationship between two regions (Portes, 1978). Alba asserts that "the various forms of immigration into the advanced industrial economies should not be considered as temporary phenomena, but should be viewed as structural elements connected with the maintenance of the system itself" (1978: 509). Important functions of migration within this framework are providing cheap labor to the capitalist sector, that labor being reproduced outside this sector and at little cost to it (Buroway, 1976); maintaining control over domestic labor (Jenkins, 1978; Bach, 1978); and consequently supporting the rate of profit in the capitalist metropolis (Castells, 1975). The historical-structural approach is thus often a functionalist approach, in that it emphasizes the functions which migration plays in the interrelationships of the two systems.

While most studies using this framework are concerned with the interdependencies of the rural-urban or satellite-metropolis regions, Singer has focused upon the factors operating in rural areas that cause migration. Given that he feels "migration is a social process of which the determining unit is not the individual, but the group," Singer hypothesizes that "structural factors affect groups which compose the social system in the sending region in distinct manners" (1972: 60). Specifically,

in areas of rapid development "change factors" will dominate, and migration will select from among those groups best able to respond to these changes -- those with more income and education -- while in areas where "stagnation factors" dominate, migration will select from the poorer groups of the society. This hypothesis bears a close relationship to one of Lee's fundamental propositions, which asserts that migration dominated by pull factors will be positively selective (of individuals) while that dominated by push factors will be negatively selective. Singer's hypothesis has been utilized by Exter (1976), who observes the differential occupational selectivity of migrants from two zones of rural Mexico. Balán et al. (1973) note that migration from Cedral, Mexico (clearly a "stagnant" agricultural area) has been predominantly positively selective, but that this selectivity has been declining over time.

Balán, presenting one of the most comprehensive analyses of migration in Latin America within the historical-structural perspective, concludes "a paradigm is yet unavailable, but some guidelines are emerging" (1978:52). Migration is seen as primarily a societal phenomenon which cannot be understood by studying individual migrants outside of this context. Likewise, it is a historically specific phenomenon, so that the application of universal models is clearly inappropriate. Last, migration must be related to processes of structural change in the economy, particularly "changes in the labor force in the process of

expansion of capitalist modes of production" (Balán, 1978: 52).

1.3 Shortcomings of the Literature on Undocumented Mexican Migration

Neither the neoclassical expected-income hypothesis nor the historical-structural approach provides an adequate framework for the analysis of the causes of migration from rural Mexico to the United States. The historical-structural approach views the process from too abstract a level to evaluate the contribution of regionally specific variables affecting the types of migration prevalent in different areas. In contrast, the expected-income hypothesis embraces both the micro and macro levels, but at the macro level it fails to distinguish major parameters of the migration process that have been identified in the literature, while at the micro level its focus upon the individual migrant obscures his relationship with the household. This section will examine these points in detail.

The most obvious of the parameters of the undocumented migration stream not explained by the expected income hypothesis is the regional selectivity of the process. Migration to the United States is generally recognized to originate from a relatively small number of states located on the border and the central plateau of Mexico, specifically Michoacán, Guanajuato, Jalisco, San Luis Potosí, and Zacatecas (Dagodag, 1975; Bustamente, 1977). United States migration is the prevalent type of migration

from an area of Jalisco studied by Cornelius and Díaz-Canedo (1976), a finding supported by a more recent investigation there which found that 1,000 of 7,595 household members were in the United States at the time of the study (Martinez, 1978).

The assumption in most studies of undocumented Mexican migration using the framework of the expected-income hypothesis is that migration proceeds from these areas because they are poor, utilize traditional agricultural techniques, and provide few employment opportunities apart from unproductive farming on small plots of land. Yet this description is even more applicable to other areas of Mexico which do not send large numbers of migrants to the United States. Ojeda emphasizes, "the great majority of migrants do not come from the poorest states such as Oaxaca, Chiapas, or Guerrero, but with the exception of Zacatecas, from regions that could be considered to belong to middle-income areas by Mexican standards" (1978: 244).

Oaxaca provides a revealing example of this important point. It is a predominantly rural state, with ninety-six percent of the population earning less than 500 pesos per month (Barbosa-Ramírez, 1976). Agriculture as is practiced in Oaxaca closely fits the "traditional" model, with subsistence crops, primitive technology and non-capitalist organization of production.

Oaxaca ranks third as a sending state for Mexican internal migration, with over one-half of these migrants going to Mexico City, and it is one of the largest contributors to the internal

flow of migratory agricultural laborers (Botey et al., 1977: 39). Yet Oaxaca sends relatively few migrants to the United States, despite their low living standards and willingness to migrate to other areas.

One of the regions of heaviest out-migration to the United States, on the other hand, has few of the characteristics of "traditional agriculture" exhibited by Oaxaca. The Bajío of Guanajuato has historically played the role of "the granary of Mexico", and continues to be one of the most productive and agriculturally diversified zones of the country. There are numerous off-farm employment opportunities available, both in agriculture and in the industrial centers of Querétaro, Salamanca, and León. By the usual measures of regional prosperity, Guanajuato is one of the more rapidly developing states, and has been projected to be a zone of attraction for internal migration (Cauthorn and Hubbard, 1976). Given the model that portrays migration to the United States as originating in stagnant rural zones with few alternative opportunities, why does Guanajuato consistently rank among the top three sending states for U.S.-bound migrants?

The failure of the expected-income model to differentiate the specific rural conditions which cause migration to flow from one area or another stems from the preoccupation of the dual-economy model with permanent migration to an urban area as the only alternative to farm production. Contrary to this assumption,

most of the rural population in Mexico is dependent upon off-farm sources of income. In Oaxaca, Barbosa-Ramírez found 71 percent of total income in a sample of the agricultural population was earned off-farm. Beals, on the basis of his research in Oaxaca, concluded, "farming is neither their primary occupation nor is it their main source of income...The ways of making a living are hence numerous and varied" (1975: 15). In Toluca, closer to the income opportunities available in the Federal District, the percentage of off-farm income rose to 83.5 (Barbosa-Ramírez, 1976). Yet these people do not choose to migrate to the United States, but rather migrate within Mexico or engage in local opportunities for off-farm employment.

The lack of applicability of the expected-income hypothesis to the situation of Mexican migration to the United States is but one example of a more general failure of this theory to confront the empirical reality of the agricultural sector of the less-developed countries. A recent study of off-farm rural employment for fifteen developing countries around the world found 30 to 40 percent of the rural labor force was engaged entirely in non-farm employment, and even for those people with land, 40 percent of their labor was employed off-farm (Anderson and Leiserson, 1977). These patterns of off-farm employment obviously involve some spatial component, whether it be commuting to a nearby urban area, working on other farms within the region, engaging in labor circulation among agricultural regions, or permanent or circular

migration to urban areas. These migration patterns differ greatly between countries and among regions within the same country, but all exhibit what White (1976) has termed "extreme occupational multiplicity." As Goldstein observes, "what evidently varies from country to country is not the variety of forms of movement relied upon, but rather the particular mix of alternatives and the exact conditions under which one or another is relied upon more heavily" (1978: 1).

Another important parameter of the migration stream that the expected-income model fails to make explicit is the duration of stay of the migrant. If the act of migration results in a positive expected income, a longer duration of stay would increase income, and hence the model would predict that migration would tend to be a permanent nature. This model apparently fails to capture the situation of most migrants from Mexico to the United States, who appear to have an average duration of stay per trip of around six months. Nor is most migration from rural localities to other permanent destinations; 63.5 percent of rural migration in an investigation by Espinosa (1978) was of short duration and to non-urban localities. In her study, Arizpe (1978) distinguished three types of migrants; permanent, temporal and seasonal. The relative mix of these types differed greatly between the two zones that she examined, but permanent migration never exceeded sixteen percent of the total number of migrants.

Duration of stay and spatial patterns of movement are

closely interrelated. Because the expected-income model cannot account for the spatial variety of labor patterns, neither can it account for the implied duration of stay of migrants within those spatial patterns. The simple dichotomy provided by the push/pull hypothesis breaks down within this situation. As Connell et al. (1976: 16) observe, the question which this hypothesis poses -- "Does the migrant prefer B to A because B is selected or because A is rejected?" -- is particularly inappropriate for the analysis of the circular migration patterns which exist in Mexico and other less-developed countries. An individual may engage in a pattern of circular migration precisely because A (the region of origin) is selected and because he does not wish to migrate permanently to B. A more appropriate specification would examine the factors which influence the choice among the different types of migration.

Another shortcoming of the expected-income hypothesis is that it is not specific with respect to the stratum of the agricultural population which is migrating. Connell et al., based upon extensive review of Indian village surveys, find "it is mainly households from the labouring and poor sections of the village who are migrating", and "migration was intimately connected to the distribution of land between households" (1976: 11-12). Cornelius (1978), on the other hand, found that it was not the landless laborers from Los Altos de Jalisco who had the greatest propensity to migrate to the United States, but small farmers and

ejidatarios. Whiteford (1979) develops the thesis that migration from the Tehuacán Valley of Puebla to the United States proceeds from the peasants with access to land and water, because they have better opportunities to utilize this income in the form of agricultural investments. The class selectivity of different types of off-farm wage labor is clearly an important and unresolved question. Amin (1974: 90) says that the Todaro model "should be seriously questioned because the migrants do not come indifferently from all the 'poor' rural regions and they are not recruited from all the 'individuals' who constitute the population."

Which brings us to a major shortcoming of the expected-income model at the micro level of application -- its emphasis upon migration by individuals. The different types of off-farm labor which have been mentioned are distributed not only among regions and communities in different patterns, but among different individuals in the same household. Urquiola finds that both internal and United States migration from San Luis Potosí are prevalent, and that "it is very common that both types be utilized within the strategy of a single family" (1978: 18). This point will be supported in detail in the following section.

The lack of applicability of the dominant migration model to processes operating in the Third World is becoming increasingly apparent to migration researchers. Abu-Lughod, in an article appropriately titled "The End of the Age of Innocence in Migration Theory," summarizes (1975: 202):

Up to this point, theory has focused largely on one central type with variations viewed as deviant. The type was the rural migrant who left his village to live permanently in the large city, quite removed geographically, culturally, and in terms of communications from his place of origin. As cases are drawn from a wider range of societies at different levels of development and in different areas, however, this type has receded into the background, or has at least taken its proper place within a larger array of possible types.

To this point, I have emphasized the failure of the expected-income hypothesis to distinguish major parameters of the process of undocumented migration to the United States, and more generally the spatial and temporal patterns of off-farm employment prevalent in rural Mexico. The focus has been upon applications of the theory at the micro level -- to the individual act of migration from one area to another. However, we have seen that this is only one side of the more general neoclassical expected-income hypothesis, and that the other side links these micro decisions to macro changes in relative factor supplies in the sending and receiving region. The specifically neoclassical relationships embodied in this linkage are subject to a different set of criticisms.

These criticisms are contained in a body of literature often called the "Cambridge Critique," which has to date occupied a rather esoteric position within economic theory (Sraffa, 1960; Harcourt, 1969; Robinson, 1970). The core of the critique is that the central proposition of neoclassical economic theory -- that there exists an inverse relationship between the relative

supply of the "factors of production" and their relative prices -- is without theoretical foundation. Given that the relative prices of these factors are undetermined, and that these prices are wages, rents, and profits, the determination of the distribution of income within the system is an open question.

The neoclassical expected-income hypothesis relates the individual migrant's expected income to the relative regional supply of factors of production. Rural areas are said to be poor because they have low land/labor or capital/labor ratios, and the mobility of labor or capital will tend to lessen this disequilibrium if the process is allowed to proceed unimpeded. The inverse relationship between factor supplies and factor prices is therefore crucial to neoclassical analysis of the causes, consequences, and policy alternatives affecting migration.

If this central relationship does not hold, the basic linkage between macro processes and micro decisions is broken. Poverty can no longer be "explained" by a shortage of land or capital. Thus the popular concept of "population pressure", measured by the basic land/labor ratio, is found to lack theoretical significance. Certainly the small plots of land common in Mexico and other parts of Latin America are instrumental in the necessity for off-farm employment, but their origins and the low incomes which they provide cannot be traced directly to "natural" conditions embodied in the aggregate land/labor ratio, but must be examined on their own terms within each specific social reality. Moreover, relative

factor prices can no longer be assumed to insure the equilibrium of relative regional factor supplies in the long run. Migration cannot be expected to lessen the disequilibrium existing between urban and rural conditions, so that the comforting view of migration as an equilibrating phenomenon is removed. It follows that the causes of the negative effects of migration can no longer be traced to "factor market imperfections," so that policy solutions which flow from this analysis may no longer have the desired effect. For instance, the application of capital to agriculture may not necessarily cause the return to agricultural labor to rise.

What we have presented in our analysis of the neoclassical expected-income hypothesis and its applications to Mexico is the simplest and most explicit exposition of the model. The neoclassical proposition which is at question, however, is so central to the development of much of economic theory that it has permeated a development ideology that, on the surface, embodies an opposing perspective of the process. According to this perspective, the proper functioning of the market system in the agricultural sector of the less-developed countries is impeded by the land tenure system, government policies which favor the larger farmers, and a class system which tends to concentrate land in a few hands. The effect of these factors is to distort relative factor prices between different agricultural classes, leading to land concentration and mechanization. Scott (1977) has called this

type of analysis "neoclassical populism" in his review of Keith Griffin's The Political Economy of Agrarian Change. Historical and structural factors, and even the development of class relations, are noted explicitly within this line of theory, but they are seen as anomalies which are not basic to the functioning of the economic system. However, in the absence of the basic relationship between factor supplies and factor prices, the importance of these elements of the agricultural systems of less-developed countries must be investigated and developed on their own terms.

Returning to the distinction which has been maintained between the micro approach of the expected-income hypothesis and the neoclassical macro model which usually serves as its foundation, the significance of the Cambridge Critique for migration theory is that the comprehensiveness and explanatory power of the generalized model are greatly diminished. The link between returns to individuals and regional factors supplies is broken, so that the theory is reduced to an explanation of migration at the individual level only and is subject to all of the previously enumerated shortcomings inherent in that approach, without the support of a macro framework.

The major problems with the historical-structural approach also concern the level of analysis at which the process of migration is analyzed. However, in this case, the level of analysis is too broad to comprehend the effects of factors operating in different

regions and upon different groups. Arizpe reaches the same conclusion (1978: 10):

(The CLACSO studies) open a perspective which analyzes migration within the context of the larger processes of industrialization and urbanization. But this new approach, macro-structural and historical, has yet to be applied to the level of the community or to small groups of migrants.

The migration of groups from rural areas is viewed from the perspective of the role which these migrants, and the rural area in general, play in the overall functioning of the economic system. But the reason for differential rates of migration or different types of migration are no better explained within this body of literature than they are by the neoclassical expected-income hypothesis. The latter theory, in fact, spells out an articulation between macro factors and individual decisions, although the theoretical basis of these linkages is subject to criticism. The historical-structural approach has in general avoided serious inquiry into the nature of these linkages. Singer's analysis of differential migration by groups responding to "change factors" and "stagnation factors" provides no internal explanation of why areas exhibit these characteristics. Processes of change in rural areas are seen as determined almost entirely by the urban metropolis. The analysis is, according to Arizpe, " 'center-determined', that is, everything which occurs in peripheral regions is no more than a mechanical result of decisions and processes which occur in the center" (1978: 47).

Moreover, although the group is emphasized as the unit of analysis, it plays no central theoretical role in the migration process. The group-selectivity of migrants from different areas could be replaced conceptually by the selectivity of individuals.

In summary, the alternatives which are available for an analysis of the causes of migration of rural Mexicans to the United States provide an inadequate theoretical basis for the generation of hypotheses. On the one hand, the structuralist approach has tended to be too abstract to be of much use in examining the specific agricultural conditions existing within regions of high migration as opposed to regions with little out-migration to the United States. On the other hand, the expected-income hypothesis is in direct conflict with the empirical reality of Mexican migration. It cannot explain the short duration of stay of Mexican migrants nor can it explain the regional and class specificity of this phenomenon. Moreover, the linkages postulated to exist between the individual migrant and social and economic forces have severe theoretical weaknesses, so that policy designed to alter the negative effects of migration based upon these linkages might be misguided.

Arizpe feels that most of the theoretical difficulties in migration literature are founded in an improper specification of levels of analysis. She says (1978:248):

The principle theoretical problem of migration lies in the articulation of levels of analysis, an

articulation which must be clarified to gain an overall understanding of a migration movement. Its macrostructural tendencies are evident at the level of aggregate data, which aids the task of theoretically integrating it with the process of capitalist development. Nevertheless, apart from correlation coefficients, the aggregation of data does not clarify the form in which the causal factors are combined nor the differential participation of social classes and particular groups in a migratory flow. It is in these two fields that an anthropological study at the micro level can make a decisive contribution. But for this it is necessary to establish a theoretical articulation with the phenomenon at a structural level, or this type of study can make valid generalizations only for the group under consideration.

The next section will attempt to outline the appropriate level of migration theory to deal with the characterization of Mexican undocumented labor migration. Various characterizations of migration streams will be explored, and various levels of analysis to deal with these characterizations will be developed.

2. LEVELS OF ANALYSIS IN MIGRATION THEORY

2.1 The Characterization of the Migration System

Any study of migration should begin by making an explicit characterization of the migration process which is to be analyzed. As we have seen, most previous research on migration in less-developed countries has adopted the viewpoint that the process may be characterized as permanent rural to urban migration. It will be shown that this characterization unduly restricts the scope of the analysis, particularly when applied to the factors affecting the migration of rural Mexicans to the United States.

Migration streams can be characterized on at least five different criteria. An obvious characterization is the type of flow; whether one is speaking of wage laborers, ethnic or religious groups, refugees, or professionals. Except at the most tautological level, that is to say, that an individual migrates because he perceives the opportunities of migration to exceed the opportunities of staying, these types of migration bear few significant similarities. For this reason, each type of migration should be analyzed within its own historical and structural setting. This study will be concerned entirely with the most prevalent of these types of flows -- the migration of wage laborers.

Migration streams can also be characterized by the intensity of their corresponding flows. The patterns and types of wage-labor migration have been noted to vary dramatically over time and among regions. For instance, until recently, the most common pattern of migration in sub-Saharan Africa was that of intense circular migration between the village and urban employment centers. Permanent migration to the United States has also been marked by periods of high intensity, each corresponding to different regions of Europe and other parts of the world.

The intensity of undocumented wage-labor migration to the United States has been a matter of great debate (Lesko Associates, 1975; Roberts et al., 1978; Heer, 1978; Keely, 1977). The phenomenon suddenly became an issue in the mid-1970's, when

estimates of the number of illegal aliens residing in the United States reached as high as twelve million (U.S. Congress, 1973). These numbers are now discredited by the INS, and a more commonly accepted estimate is that there are from three to four million illegal aliens residing in the United States (Castillo, 1978). If that number is true, and if two thirds of these are of Mexican origin, there would be at least two million undocumented Mexican aliens, or 13 percent of the Mexican labor force, working in the United States. Moreover, unless recent figures on apprehensions have been inflated by more effective apprehension techniques, their four-fold increase from 1970 to 1978 would indicate that this migration stream is growing appreciably.

A third criterion upon which the migration stream may be characterized is the spatial nature of the process. There are two dimensions of this spatial nature, the first and the most obvious of which is the distance the migrant travels. Migration may be within the local area on a daily or weekly basis, distinguished from forms of commuting found in the developed countries by the longer periods of time required to travel short distances. Migration may be interregional, involving either a permanent or semi-permanent relocation of the migrant to another region, or a circular move of migratory wage labor through agricultural regions to harvest crops during different seasons. Last, migration may be cross-national, which is the case of Mexican migration to the United States. It is difficult to say which of

these types of spatial movements is most common within any one underdeveloped country; frequently all may interact, even within the same community or household.

Another dimension of the spatial nature of the migration stream relates to the population density in the sending and receiving regions. That is, migration may be rural/urban, urban/urban, rural/rural, or urban/rural. Past research has assumed certain types of spatial movements correspond to particular stages of economic development. Rural/rural migration, for instance, was seen as a stage in the transition to rural/urban migration, in which the migrant was assimilating experience to enable him to deal with the urban environment. Urban/urban migration, on the other hand, has been a phenomenon most commonly exhibited in the industrialized countries, although recent studies have shown a great deal of urban/urban migration to exist in Mexico (Balán, 1974). Until recently, urban/rural migration has been practically eliminated as a valid subject for research because of its low incidence. However, analysis of data from 1976 preliminary census of the United States shows that this type of migration is rapidly assuming importance in many areas of the country.

The final and, for the purposes of this study, extremely important criterion upon which to characterize the migration stream is the duration of stay of the migrant away from his community of origin. It may be permanent, in which the migrant

does not return except for visits to the region of origin, and probably has no intention of returning to that region. It may be long-term, in which the migrant desires to return to the region or origin after some extended period of time. Rural/urban migration within Mexico is frequently of this type, although the express desire of the migrant to return to the village may not be fulfilled. Finally, migration can be of the type which has been termed circular, recurrent, or pendular. This type of migration involves three sub-categories: daily, weekly, or biweekly commuting; intermittent migration which is periodic in nature, but not necessarily at the same period of each year; and seasonal migration, which is predictable duration and often related to the agricultural cycle.

As we have noted, most of the literature of migration in less-developed countries has limited the focus of inquiry to permanent rural/urban migration. The exception to this preoccupation has been the analysis of African population movements. J.C. Mitchell (1961) was the pioneer in this area, defining movements of labor circulation between village and town. Gould and Prothero (1975) examine the spatial and temporal nature of African population mobility, and observe two basic temporal dimensions of the migration streams. The first they call migration, which is either long-term or permanent, and the other they call circulation, which can be daily, periodic, seasonal or long-term. Zelinsky (1971) believes that these

different types of migration follow one another in stages, and sees a transition through different patterns of mobility similar to stages in the demographic transition or the so-called stages of growth, with circulation being replaced by more permanent moves as development occurs. Chapman disagrees: "Circulation, rather than being transitional or ephemeral, is a time-honored and enduring mode of behavior, deeply rooted in a great variety of cultures and found at all stages of socioeconomic change" (n.d.: 5).

Studies of labor circulation in Latin America are rare. Donahue (1975) examines circular and return aspects of labor migrations in southern Colombia, while Balán has used the term "pendular" to refer to the circular migration of workers within Mexico and from Mexico to the United States.

The misconceptions and consequent policy implications of a misspecification of any one of these characterizations of the migration stream can be dramatic. A glaring example is given by the consequences of an error concerning the duration of stay of undocumented Mexican workers in the United States, incorporated into the Lesko report (Lesko Associates, 1975). While it was recognized that there was return migration of Mexican workers, there was no direct information upon which to base the estimate of this return migration. The Lesko report resorted to an analogy between this flow and the number of legal European immigrants who had subsequently immigrated to another country or returned

to their own country. Finding that only two percent of European immigrants had engaged in return migration, Lesko inappropriately applied this percentage to their derived inflow of Mexican undocumented aliens. A coefficient of return migration of only two percent implies that the average duration of a stay of a Mexican migrant in the United States is fifty years (Roberts et al., 1978). This patently is in conflict with all available evidence. Even if we hypothesize that Cornelius' data indicating an average duration of stay around six months is biased by capturing only the part of the migration stream which returned to Mexico, and that a significant number have stayed permanently in the United States, the implied duration of stay would be at most between one and two years. If an average duration of stay of fifteen months is substituted in the Lesko formula, the resulting estimate of the number of illegal Mexican aliens in the United States in 1975 would not be 5.2 million, as the report concluded, but approximately 1.2 million. Had this one parameter been changed, the tone of debate following the widely publicized estimate might have prevented the proposal of ill-conceived legislation.

Mexican migration to the United States involves a very specific set of characteristics. The duration of stay is predominantly temporary, and the spatial nature that of a basically biregional movement between the point of origin and the point of destination, without stopping any longer than is necessary at

intervening points. It is most definitely wage-labor migration, engaged in by young males in support of themselves, their families, and their relatives in Mexico. (This study, by focusing on migration from rural areas of Mexico, does not consider the substantial migration of women that is prevalent within the border areas). The duration of stay of the average migrant seems to be short to medium-term, with a modal group staying from four to six months and another group staying a longer period of time. As such, there is a close resemblance between undocumented Mexican migration to the United States and wage-labor migrations in other parts of the world, such as from Turkey, Northern Africa, and Southern Europe to the more industrialized parts of Europe (Hansen, 1978). There are important differences also, the most obvious being the legality of the European situation. However, any theory which attempts to explain the phenomenon in one region must be capable of providing a similar type of explanation for the phenomenon in another region, with the only significant change involving the magnitude of the parameters.

Explicit recognition of the wage-labor character and circular nature of the Mexican migration stream not only liberates the inquiry from the dominance of the prevailing characterization, but it also allows this migration to be seen within the context of all the various types of wage labor engaged in by rural Mexicans. As will be shown in the next section, the perspective gained by placing undocumented migration within this context

has important implications for the development of a program of research on the subject.

2.2 The Characterization of the Analysis

Given an explicit recognition of the characteristics of the migration stream, we may formulate the appropriate level of analysis to answer the specific question of inquiry. In this case, the question concerns the causes of migration of rural Mexicans to the United States. When placed within the context of the previous characterization of this migration, the question becomes significantly altered: Why does a rural Mexican choose wage-labor migration to the United States among the various alternatives existing in different regions of Mexico for off-farm wage labor?

The concept of the level of analysis is concerned with the level at which the factors affecting the outcome of the migration process are analyzed. For instance, at the individual level of analysis, the factors affecting the migration decision are a combination of objective and subjective factors such as wages, distance, and preferences. The unit of analysis is the individual, and the appropriate unit of data collection also the individual. All data are collected only as they affect the individual, that is, his wages, costs of living, education, etc. The factors which influence the outcome of the migration decision are purely those individual factors as perceived by the potential migrant.

At a higher level of analysis are community and regional factors which affect these variables, such as economic factors that determine wages or cultural factors that condition individual responses to wage-labor alternatives. These factors are defined at the regional level of analysis, and while some data can be collected from individuals, regional variables must be used to explain individual responses. In the two-sector neoclassical model, for instance, relative land/labor ratios and agricultural productivity are said to be major variables affecting migration. Likewise, the historical-structural model examines regional class relations and regional articulation of the capitalist and subsistence sectors in agriculture.

A last potential level of analysis for the question of migration is the international level. This approach views the migration process as one of labor flows between two different economic systems, each with their specific endowments of capital and labor or with their specific economic relationships which expel and attract flows of labor. As with other potential levels, this example illustrates that two separate viewpoints can be represented within this level of analysis, one focusing upon factor mobility and the other upon relations of economic dependence. A common characteristic of both approaches within this level is that migrant labor is seen as a commodity. In one case, the mobility of

the commodity labor with respect to the specificity of capital is analyzed; in the other, the forces that produce surplus labor in the dependent economy and the excess surplus value derived from migrant labor in the advanced capitalist economy are the focus of inquiry.

Having decided upon a level of analysis appropriate to the question being investigated, the next step is to decide upon the unit of analysis, that is, the unit upon which the data is analyzed. This may or may not be the same as the unit upon which the data is collected. For instance, in a study adopting the historical-structural model, the data may be collected from individuals, but those individuals are aggregated into social classes. A neoclassical analysis, on the other hand, would adopt the individual as the appropriate unit of analysis, given the focus of that approach upon individual responses.

The choice of unit of analysis is probably the most important the researcher will make, other than that of the basic theoretical approach to follow. It determines how the data will be aggregated, and therefore the conclusions that may be drawn from it. Rural surveys, for instance, often consider land size to have such a dominant influence on production and employment that they aggregate individual responses into farm size categories. In other surveys, community factors are highlighted by maintaining a distinction

between respondents from different villages. Individual attributes can be maintained by utilizing a multiple regression technique, or individuals can be aggregated by social class, race, ethnic group, and a variety of other criteria. Like the level of analysis, the appropriate unit of analysis is determined by the theoretical approach that is employed.

Four potential units of analysis that bear particular relevance to the question of Mexican migration are those of the individual, the household, the social class, and the mode of production. The neoclassical approach has been shown to focus on the individual as the appropriate unit of analysis, both at the individual and regional levels of analysis. The Marxist approach focuses upon the social class or the mode of production, and always at the regional or the international level of analysis. The focus on the household has generally been left to the anthropologists, and it is they who have in many cases provided the necessary characterization of the migration stream to enable an appropriate theoretical approach to be developed.

Having decided upon the appropriate level and unit of analysis with which to address the subject of inquiry, it now becomes a relatively easy matter to decide the type of data which must be collected. Probably the most important question concerning the type of data is that of the unit of

data collection. The unit of data collection can be the individual, the family or household, the extended family, or the community, but it must be consistent with the choice of level and unit of analysis in order to draw rigorous conclusions.

Other aspects of the description of data collection are its geographic limits, where the data is registered (at the region of origin, destination, or in the form of net migration rates), the method of data collection (survey, census, or some other method), and the temporal nature of the data (whether it is at a discreet point in time or covers an interval of time).

It is apparent from the discussion above that the choice of an appropriate level of analysis, unit of analysis, and unit of data collection involves a variety of alternatives, so that the researcher must select the configuration which is most appropriate to the question posed. This choice is constrained by the requirement that the theory be consistent among the various properties of the analysis that are assumed. If one is carrying on the investigation within the regional level of analysis, for instance, certain assumptions with regard to individual responses and to the processes taking place within the national and international spheres must be made. Each level of analysis is linked to the next, and each unit of analysis can be aggregated into other units which may or may not be appropriate for the specific topic of research. This emphasizes the importance of choosing not only the proper level of analysis, but in being careful to make explicit the assumptions operating at higher levels of analysis which affect the functioning of the system at the level being considered. The next section will develop and defend the level of analysis, unit of analysis, and unit of data collection adopted by

this study.

3. THE REGIONAL AGRICULTURAL SYSTEM AND HOUSEHOLD WAGE-LABOR MIGRATION IN MEXICO

3.1 Introduction

The region will be the focus of the analysis within this study, in order to capture the factors which cause Mexican migration patterns to exhibit such a large degree of regional specificity. The previous section showed that circular migration to the U.S. originates predominantly from several states in the Central Plateau and along the border, and even within these states significant differences exist between communities with respect to types of migration patterns between communities are also noted in two studies of Mexican internal migration. Arizpe (1978) found that migrants from the village of Toxf were usually women supplementing farm income through fruit vending in Mexico City, while nearby San Felipe generally expelled whole families into a permanent migration stream. Beals encountered a similar situation in Oaxaca: "in Magdalena Ocotlán...seasonal labor outside the village is quite common...In nearby San Antonio, emigration is frequent but few seek seasonal wage labor outside the village" (1975:69). Thus the region and community which are the focus of analysis must be carefully chosen to represent a homogeneous set of factors influencing the migration decision.

Because the focus of the inquiry is upon the various alternative forms of wage labor chosen by rural Mexicans, the analysis must contrast the relative opportunities for off-farm employment existing in different regions. This emphasizes the importance of studying not only rural agricultural employment, but also rural-

industrial employment, rural-service employment, and urban employment. As Breman says, "certainly as far as labour relations are concerned, town and country cannot be regarded as separate economic sectors. Thus an investigation into non-agrarian labour must be conducted on a regional level" (1977: 174).

Within this regional focus the choice of unit of analysis must reflect another central characteristic of circular migration from Mexico to the U.S.--that it is almost entirely wage-labor migration. Thus the rural elite may be eliminated from the analysis, for they may exhibit migration to urban Mexico or the U.S. for reasons such as education. The focus should be upon the rural proletariat.

The evidence indicates that the appropriate unit of analysis should be the class of the rural population who are dependent upon wage-labor. Singer advocates this approach, maintaining that "migration is a social process whose actual unit is not the individual but the group...Its structural causes...affect groups that comprise the social structure of regions of origin in distinct manners" (1972:60). It is also supported empirically by Connell's examination of Indian village surveys, which reached the conclusion that "push and pull operate together, but on different social classes" (emphasis in original) (1976: 198).

The rural proletariat in Mexico is comprised of two theoretically distinct groups -- those who own land and those who do not. But this distinction is empirically difficult to maintain, because the great majority of the agricultural population with land depend upon off-farm labor for a large

part of their income. The Centro de Investigaciones Agrarias found in a survey of 900 landholders that 40 percent worked not only on their plot of land, but also off-farm; one-third of these as agricultural day-laborers and one-half in non-agricultural activities. Over one-half of these landholders received at least as much income from off-farm activities as they did from their land (1974: 44).

The distinction between landowner and proletariat in Mexico is also blurred by the fact that landless laborers are very often the sons of landowners. Land was distributed by the Agrarian Reform following the Revolution to many landless laborers, but the ejidal system prevents this land from being sold or divided among heirs. The sons of ejidatarios, and also of small private property owners (pequeños propietarios) often maintain their ties to the family property by living in the same household or village. Even if they have migrated to an urban area, it is not unusual for them to return to the family farm to aid the household in agricultural labor during peak seasons. This illustrates a central thesis of this chapter, that the occupations of different members of this extended group are not independent of one another, and necessitates a focus upon the household as the appropriate unit of data collection. This point will be developed in detail in a later section, but the role of the household as a central link between peasant agricultural or handicraft labor and occupations in the urban sector cannot

be overemphasized. Cliffe reaches the same conclusion in his study of labor migration in Zambia: "indeed, the set of relationships known as 'family' is in flux as it is at the heart of the articulation between the two modes" (1978: 329).

It is clear then that the unit of analysis can be neither the purely rural proletariat nor the "subsistence" peasant farmer. The latter category is rare in Mexico, while it appears that the former may have ties to the land which significantly modify their behavior as wage-laborers. Theoretical attempts to subordinate one of these roles to the other are usually the result of the application of an extremely rigid perspective, as when peasant subsistence production is judged to be "self-exploitation," because the valuation of family labor inputs at the market wage would cause negative economic returns (Paré, 1977; Vergopoulos, 1975). I will therefore employ the concept of the peasant mode of production as the most appropriate unit of analysis, emphasizing the peasant in both of his current roles -- farmer and wage-laborer. The following section will defend this choice.

3.2 The Articulation of Modes of Agricultural Production

The concept of mode of production has usually been employed within Marxist theory to differentiate capitalist production from other types. Marx explored the "Asiatic mode of production" and contrasted capitalist production with its predecessor, feudal

production. In these discussions, the central feature of a mode of production was the dominance of the economic system by a set of relationships which together determined the organization of production, the distribution of the surplus, and the evolution of the system over time.

It is only recently, however, that the concept of mode of production has taken on theoretical importance outside of Marxist theory. The theory of a dual economy, examined earlier in this chapter, introduced to many social scientists the notion that there were at least two economic sectors in less-developed countries, with different factors affecting the internal dynamics of each. The development of the concept of modes of production has departed from this theory in two important ways; it differentiates capitalist and non-capitalist agricultural production, and it emphasizes links between these two types of production, how these links change over time, and the effect of these changes upon each of the systems of production and distribution.

The recognition that there are different systems of agricultural production is central to an understanding of Mexican agriculture and the migration patterns which it exhibits. Balán stresses, "the myth of a uniform traditional agrarian society with limited spatial and social mobility needs to be debunked in order to understand historical and contemporary processes" (1978: 4). Mexico displays wide regional variations

in types of agricultural production. Highly commercialized and mechanized agriculture is found in northwest Mexico; traditional techniques and subsistence crops are prevalent in the Central Plateau, while the Gulf Coast exhibits characteristics of tropical agriculture.

But it is the intra-regional differences in systems of agricultural production which are most interesting for the study of migration patterns, for the primary linkage between these systems is agricultural wage labor provided by the peasant mode to the capitalist mode. The provision of a labor force for commercial agricultural production has been a central role of the peasant mode of production throughout post-Conquest Mexican history. Chevalier (1970) analyzes the development of the hacienda system in Mexico and the requirements of that system for a stable labor force for seasonal agricultural work. Wolf (1955) is even more explicit in his focus on labor relations in the Central Plateau region. He studies the development of the hacienda in the fertile valleys and the consequent push of a great portion of the agricultural population into the mountainous regions of the plateau. He emphasizes that the constant problem of the hacienda was to secure a reliable labor force, leading to the evolution of a system of debt-peonage to bind agricultural labor to the hacienda. Even the system of ejidos which emerged after the Mexican Revolution has been seen as a method of providing a stable agricultural labor

force. Whetten observes, "in the early stages of the agrarian program, the ejido was viewed essentially as a part-time farming program that would offer farm laborers the opportunity of supplementing their income from wages or raising some of their own food and fuel on a small strip of land" (1948: 241).

This brief historical overview illustrates that the peasant mode of production has seldom existed in Mexico as a closed economic system, but has been significantly influenced by its response to the needs of commercial agriculture. Stavenhagen, one of the leading theorists on Mexican agrarian relations, cautions (1978: 31):

the classical model of the peasant economy is no doubt that of the small agricultural property which is almost entirely self-sufficient, and in which external mercantile relations are only complementary to family production. But this classic model is only that, a model.

The capitalist mode of agricultural production uses labor from the peasant mode rather than a permanent hired labor force because of the inherent seasonality of agriculture. Seasonality is an aspect of agricultural production not often recognized in either the dual-economy models or current models of rural migration, at least in part because of the methodology employed. Economic activity is usually framed within the context of a production function which represents output as a timeless function of the combination of various inputs. Georgescu-Roegen is extremely critical of this approach to

agricultural production, for while he concedes that the production function may adequately represent industrial processes, he stresses that "the role of the time factor is entirely different in the two activities" (1976: 4). Thus we see that just as our approach may be misled by a misspecification of a parameter of the migration process or an inappropriate choice of level of analysis, the methodology employed in testing hypotheses may negate central features of the process being analyzed.

The seasonality of labor inputs existing within any one agricultural region is the result of the combination of the labor inputs for the various crops produced within that region. The regional crop mix is in turn a function of the technical and economic conditions of production. A primary technical condition of production is whether the land is irrigated or unirrigated. In areas of low rainfall such as the Central Plateau, unirrigated land cannot be used for anything but the production of subsistence crops like corn, while irrigated land can be used to produce a variety of commercial and subsistence crops. The choice of crops for a small farmer with irrigated land, on the other hand, may determine his crop composition partly in accordance with seasonal labor supplies and the required labor inputs of various crops. Therefore, cropping patterns may be adjusted by either the capitalist or subsistence mode to recognize the mutual interdependence of these agricultural systems. Cleave has studied these inter-

relationships in Africa, and found "the need for flexibility, in the form of either a readily available pool of labor or easily adjustable subsistence sector" (1974: 85).

Migration from a region results when periods of slack activity in the peasant mode do not correspond to periods of labor demand by regional commercial agriculture. Arizpe studied an unirrigated area of Mexico's Central Plateau dominated by traditional crops, and found that "the months in which the campesinos go to the city are December, January, April, May, August, and September" (1978: 101) -- all slack months in the corn cycle. Connell concluded that "the pattern of return migration will vary among villages and in accordance both with the different labour demand created by different cropping patterns and production techniques, and with the ability of the village households to find alternative labour, either by hiring or by exchange" (1976: 123).

Making explicit the seasonality of Mexican agriculture may also substantially affect the desirability of programs of agricultural development whose purpose is to stem the flow of rural migrants by increasing agricultural employment. The CHAC model of Mexican agriculture demonstrates that simulation of different patterns of agricultural development leads to "employment changes concentrated in one period of the year, rather than being spread evenly throughout the year" (Goraux and

Manne, 1973: 461). Should this period correspond to an existing period of peak labor demand, no new employment would be created; on the contrary, mechanization or change in crop composition could result, causing a reduction in employment.

To this point labor flows from the peasant to the capitalist mode have been stressed as the primary form of interdependency between these modes. The centrality of these flows for the purposes of this study cannot be overemphasized, because in most cases the type of migration being studied, whether it is seasonal migratory labor, cityward migration, or circular migration to the U.S., consists of labor flows between the peasant and the capitalist modes.

There are, however, other interdependencies which relate directly to the study of migration and off-farm labor. Primary among these is the dependence of members of the peasant mode upon commodities purchased from the capitalist mode. Articles once fabricated within the community or household, such as clothing, furniture, and utensils, are now purchased from the market. Moreover, even "traditional" agriculture requires increasing quantities of purchased inputs to offset declining fertility and increase yields. Arizpe found that the value of purchased inputs to all inputs increased from 30 percent in 1930 to 80 percent in 1970 (1978: 234), and observed that "campesinos get the money to buy fertilizer through seasonal labor in Mexico City" (1978: 104). This is an important feedback effect of

migration totally ignored by the push/pull model, for in this case migrants are neither pushed nor pulled, but rather work seasonally in the city in order to purchase inputs to allow them to continue agricultural production. As noted previously, Whiteford (1979) attributes a similar motive to U.S. migrants from Puebla.

A final form of articulation between the peasant and the capitalist modes of production in agriculture is through the marketing of commodities produced in the peasant mode. Usually these commodities consist entirely of surplus agricultural production of the subsistence crop. In Mexico, it is common for the peasant producer to sell a part of his crop directly to a local buyer, either because he lacks the means to transport it to the market, or because he has committed this production in exchange for agricultural inputs or consumption loans. Other marketed commodities may include articles of handicraft production, animal products, or firewood gathered by members of the peasant household.

We have described thus far the peasant mode of production and the major forms of articulation between this mode and the capitalist mode, emphasizing the flows of labor from the peasant mode to secure cash to purchase articles from the capitalist mode. These labor flows often involve migratory activity by members of the peasant mode. We must now examine the evolution of this system of relationships over time in order to determine

how migratory activity is influenced.

Marxist analysis provides a clear set of hypotheses with respect to the articulation and evolution of modes of production. Given the consistency of the basic concept of modes of production with the Mexican situation, and the prominence accorded this theory in Third World countries which exhibit these processes, these hypotheses deserve explicit consideration in our theoretical and empirical analysis. Marx saw the eventual domination of the peasant mode of production by the capitalist mode, leading to a proletarianization of the peasantry. He said (1967: 642):

as soon as capitalist production takes hold of agriculture, and in proportion to the extent to which it does so, the demand for an agricultural labouring population falls absolutely, while the accumulation of capital employed in agriculture advances without this repulsion being, as in non-agricultural industries, compensated by that greater attraction. Part of the agricultural population is therefore constantly on the point of passing over into an urban or manufacturing proletariat, and on the lookout for circumstances favourable to this transformation.

There are two elements to this theory; the peasant mode is dominated by the capitalist mode, and this domination leads to an absolute decline in available agricultural employment for members of the peasant mode. The mechanisms by which this process of domination and expulsion of labor occur are too complex to be examined in detail, but the major features of the analysis can be outlined. The capitalist mode of production is said to be different from other modes in that whatever surplus is

extracted is accumulated and reinvested in the productive process. The peasant mode, on the other hand, either produces no surplus or uses it for other ends. Thus, "the organization of the capitalist process for production once fully developed breaks down all resistance" (Marx, 1967: 737). Capital is reinvested in more productive technology and in land acquired from the peasant mode until the peasant mode is relegated to the more unproductive lands, and the peasant producer finds it difficult to subsist on his agricultural output and must find work as a wage laborer.

An example of this process exists in Mexico, where the ejido system purportedly exists to protect the peasant producer from encroachment by the market system. Based upon the tenets of the Plan de Ayala incorporated into the Mexican Constitution following the Revolution, that "the land is for those who work it," the ejido system forbids the selling or renting of ejidal land. Yet in cases where the ejido has been located upon fertile lands appropriate for commercial production, this system has failed to protect the ejidatario from capitalist penetration. Unable to purchase the inputs which would enable him to produce commercial crops, the ejidatario often rents land to the capitalist farmer, and then may work on that same plot as a wage laborer (Barbosa and Maturana, 1972). Baring-Gould, studying the effects of agricultural technology upon community differentiation in the Central Plateau of Mexico, observes this process in

the ejido system there (1974: 221):

The basic underlying conclusion of this research has been that in the technologically advanced ejidos, their agriculture has been largely expropriated by non-ejido interests...The agriculture and the real producers of this agriculture are becoming closely and vertically integrated into the regional system, without the same process occurring for the ejido as a unit and the community in which it is located. The result is a dualistic structure, in which the agricultural and ejido community systems form two distinct parts. The distinction from the traditional concept of dualism is that these component parts are highly interdependent. Ejidatarios may continue to work on their parcels as hired laborers, or crops which they grow may be turned-over to others in sale due to crop liens. Urban migration or unemployment are frequently the only alternatives remaining within an agriculture and community over which they hold little control and from which they derive few benefits.

The process of capitalist penetration in agriculture implies on the one hand the creation of a demand for wage labor to work on the land taken under capitalist control, while on the other the creation of a surplus of peasant producers which will provide the necessary wage labor to meet this demand (Kautsky, 1974: 19). Within the subordinate relation of the peasant mode of production to the capitalist mode, the balance of this creation and absorption of wage labor employed in agricultural activities cannot be resolved in favor of the peasant producer by a long-term increase in employment over its previous level. The capitalist mode will alter the process of production or seek wage labor from outside the region in response to labor conflicts created by its expansion. Cleave

finds that in African agriculture "perhaps the most impressive and consistent feature of the surveys are the extent to which farming systems were modified in response to labor conflicts" (1974: 131).

Technological change, particularly mechanization of certain key activities in the production cycle, is a common means by which labor conflicts are resolved. A second and interrelated method is to change the regional composition of crops. The tremendous increase in the production of grain sorghum in central Mexico can be seen as a direct response to the ease of mechanical harvesting of this crop, a substitute for traditional corn production. Rendón (1977) found that changes in the composition of Mexico's crops were the greatest contributor to the decline in demand for agricultural labor between 1960 and 1973, causing a 0.6 percent decrease in the total labor force employed in agriculture over this period. Women and children may be used for production of the subsistence crop, freeing male labor for commercial production or for labor migration (Dasgupta, 1977).

The primary hypothesis that emerges from this analysis is that off-farm wage labor, often involving some form of migratory activity, is directly related to the regional penetration of capitalism. Studies from diverse regions support this hypothesis. In Mexico, Unikel et al. (1973) found that agricultural productivity had a negative association with migration in the "modern"

states, while it had a positive association in the "traditional" agricultural states. Connell found "the degree of commercialization of agriculture was positively related to out-migration" in Indian villages (1976: 10). McGee, studying rural/urban mobility in South and Southeast Asia, contends, "an understanding of the reasons for and the features of internal mobility within the states of South and Southeast Asia rests upon the delineation of the broad process of capitalist penetration of the region" (1978: 200). In Colombia, Donahue concludes, "circular and return migration among wage-laborers is often an expression of their full but inequitable integration into the economic and social structures in the rural areas as peasant farmers, and into the urban areas as wage laborers" (1975: 13).

While a clear hypothesis about the causes of the migratory activity of rural peasant producers has emerged from this analysis, the exact form which that migration takes in any given region is not specified. There are a number of conflicting theories about the effects upon migratory activity of various aspects of the peasant mode and its interrelationships with the capitalist mode. Stiglitz (1973) hypothesizes that landless peasants, having neither alternative sources of employment activity nor the security of a plot of land, will be more prone to migrate than landed peasants. Connell's data is neither supportive of this hypothesis nor of its polar opposite. Stavenhagen (1976: 165)

believes peasants with land will be more prone to migrate, since "the agricultural wage laborer cannot easily look for work in other parts because his scarce resources do not permit him to move great distances without the security of finding a job." All of these hypotheses, though lacking consistency, imply the pattern of spatial mobility exhibited by landless laborers will be different than that of peasants with land.

The contradictory predictions of these hypotheses relate to the generality of the level of analysis at which they are developed, and the one-dimensional view of migration which they employ. With permanent migration as the only option to staying on the farm, a false dichotomy of rural households as migrant or non-migrant is created. In fact, many types of migration and off-farm labor are used, often within the same household.

This examination of off-farm labor in the peasant mode of production has identified a conceptually clear and potentially testable hypothesis -- that the development of the capitalist mode of production will cause members of the peasant mode to become increasingly dependent upon off-farm sources of income. However, it remains an exceedingly general hypothesis, for the form which this off-farm labor takes is not specified. Marx seemed to believe that capitalism would completely envelop non-capitalist modes, stripping peasants of their land to become either landless laborers or an urban proletariat. In fact, the type of articulation between the peasant and the

capitalist modes of production, and the resulting migration patterns, vary widely even within a country such as Mexico. This necessitates a focus upon the regional level of analysis, but moreover, it necessitates clearly identifying the role of the main actor within the peasant mode at this regional level -- the household. The following section will examine the peasant household as the appropriate unit of data collection, and the factors which affect the allocation of household members to different labor activities, within regions and between regions.

3.3 The Allocation of Household Labor

3.3.1 Introduction

In the previous section wage labor was examined as the primary type of articulation between the two predominate modes of production in a developing agricultural economy. The peasant household is central to this articulation, for it both encompasses as part of its income-producing activities the allocation of different individuals to different occupations and it functions as the decision unit responding to a variety of cultural and economic factors at the regional level.

The first consideration makes it necessary to employ the household rather than the individual as the unit of data collection, thus potentially aggregating the labor activities of several individuals. If the individual were adopted as this

unit, a particular labor activity would be related to factors common to other household members who are employed in diverse occupations. For instance, a study of permanent individual migration to urban areas might conclude it was the poorest from an area who migrate. In fact, the majority of the poor households might retain their rural residence, in part due to remittances from the individuals who had migrated. Murphy says that literature on Mexican rural-urban migration "demonstrates how the move to the city for a rural individual is often part of an elaborate strategy to secure a better position in the social structure and a more certain income for the domestic group as a whole" (1979: 9). The same process seems to exist in other regions as well. Studying India, Breman concludes (1977: 175):

The composition of the household -- most of whose members in the lower income brackets are ready to work -- is definitive for the way in which the consequences of individual unemployment can be met. For this reason alone the analysis of the labor market in such a system cannot be based on individual, but must focus on the household.

The second consideration, that "the household is the unit of adaptation in the sense that it makes everyday decisions affecting the group in achieving maximal reproductive success" (Murphy, 1979: 8), makes it imperative that the unit of data collection not be aggregated higher than this level. Village studies such as that by Dasgupta (1977) suffer from the

I aggregation of many diverse types of households, some more properly classified as capitalist farms. Moreover, this consideration makes the study of the allocation of peasant household labor an important theoretical issue, for households are the adaptive unit in the constantly changing pattern of articulation of the peasant and capitalist modes in a developing agricultural economy. As Long and Richardson assert, "households frequently develop livelihood strategies involving members in qualitatively different relations of production... Interdependencies exist and cross-cut modes of production and economic sectors" (1978: 186).

The analysis of the household as the appropriate unit for the study of an agricultural system is not a theoretically new approach. Chayanov, writing in the 1920's, was the first to make explicit the role of the agricultural household. He recognized the interdependence of agricultural and non-agricultural pursuits, stating: "because the family's agricultural undertakings and craft and trades activity are connected by a single system of the basic equilibrium of economic factors, they cannot be reviewed independently of one another" (1966: 102). But having acknowledged this interdependence, he turned to analysis of the family as an exclusively agricultural unit of production, ignoring their role in non-agricultural sectors of the economy. The farm family was taken as an entity independent of the rest of society, allocating its labor as a

function of the product to be received from working the land relative to the labor required to produce this output. This model is but an early version of the labor-leisure trade-off which later found its resurgence in neoclassical theory applied to the agricultural sector (Nakajima, 1969). The following sections, examining the factors which determine the allocation of peasant household labor, will amply demonstrate the artificiality of the theoretical construct of the closed peasant economy.

3.3.2 The Allocation of Peasant Household Labor

The allocation of peasant labor to off-farm activities is often seen as a direct function of on-farm requirements. The view that migration to the United States occurs because "surplus workers are accumulating in agriculture" calls to our attention the simple dual-economy models, in which peasant agriculture evolved from an ideal state of equilibrium between family labor and land size. In this model, declining mortality leads to demographic pressure on available land and decreasing agricultural employment per person. Off-farm labor is therefore seen as the residual between the family labor supply and on-farm employment.

The realities of production and labor allocation in the peasant mode offer more alternatives than are incorporated in this simple model. The composition of crops can be altered or

combined with animal husbandry to affect both the total amount of labor required and its seasonal distribution. Moreover, labor is often hired to work on the farm, thus eliminating potential bottlenecks or allowing some members to work off-farm at greater distances or for longer periods of time. In Toluca, for instance, a region of Mexico embracing predominantly traditional farms with subsistence crops, over 50 percent of total farm labor is hired (Barbosa-Ramírez, 1976). In Egypt, Hansen found "a typical pattern of small-farm behavior is to hire women and children for this kind of agricultural work at the same time as the men of the farm take hired labor outside the farm" (1969: 303).

The allocation of household labor in small-scale agriculture frequently consists of a mix of on-and off-farm activities by different members of the same household. In Japan, labor on small plots is frequently undertaken by the elderly of the family: "more and more of the young and especially male laborers are being employed off the farm, even if they continue to live there. Thus a modern Japanese farm family has both a dual income source and pattern of labor allocation" (Kada and King, 1974: 22). Nutini and Murphy encountered a variety of patterns of wage-labor migration in the area around Tlaxcala, Mexico. Thirty percent of the labor force in the urban areas live in the rural areas, and "labor migration has played an important

and sometime critical role in the economy of the communities" (1970: 89). Beals found an "impressive number of economic options open to the Oaxacan peasant, and characteristically he makes use of several of these either concurrently or sequentially in the course of a year or during his lifetime" (1975: 14). And most important for the direct purposes of this study, U.S. migration is only one component of a mix of alternatives to agricultural work on the family farm chosen by households. The foremost study of migration from rural areas of Mexico to the U.S. concludes (Cornelius, 1978: 48):

It is clear that we are really dealing with a complex migratory system that includes both internal and international *population movements*. A given family will often produce several migrants who go to cities within Mexico, as well as several migrants to go to the United States. It is also very common to find individuals with a history of both internal and international migration. In fact, 45 percent of the undocumented migrants to the United States included in my study also had one or more extended work experiences in Mexico, outside their home communities.

The basic motivation of the peasant household in a continuing series of decisions concerning labor-allocation is the maintenance of household viability, or more directly, survival of the household. This implies that households in the peasant mode commonly live at the margin of existence, so that obtaining stability of a minimal income rather than maximization of that income is the key to labor allocation. Income maximization could be accomplished as easily by each

individual as by the household, and we have seen the allocation of off-farm labor and ensuing migration is a household phenomenon, with joint decisions and shared resources. Survival implies a different goal and different methods. Dinerman observes, "as a general principle, each household attempts to maximize its security and minimize severe economic losses" (1978: 494). Barbosa-Ramírez concurs in this conclusion: "the family with a given amount of resources will tend to distribute available labor on and off the farm in order to assure above all the minimum consumption necessities" (1976: 135). And it is increasingly evident that in order to cover these minimum necessities one or more sources of off-farm income are required. A recent world-wide study of non-farm employment in rural areas found "the survival of the household depends on its members' ability to augment the household income in non-farm employment during part or all of the year" (Anderson and Leiserson, 1978: 27).

Even migration of the United States must be explained within the context of survival of the household. Cornelius rejects the hypothesis that migrants have a "target" income which will give them a "stake" to invest in land or some other enterprise upon their return. He says that the phenomenon could be more accurately described as "crisis-induced, income-maintenance migration," which "reflects an acute need to accumulate relatively small amounts of cash, in order to maintain economic viability"

(1978: 29).

While there might seem to exist a contradiction between the meaning of "crisis" and the thesis that the United States migration is and has been an integral part of the allocation of household labor in certain regions, it could be reasonably maintained that peasant households in some regions are in a state of permanent crisis. No other explanation exists for Cornelius' statement, given his emphasis upon the historical evolution of the process and household mobility over several generations. However, the question of why farmers in this region chose U.S. migration rather than other options still exists, for the peasant mode in most of Mexico is under economic pressure. Seasonal migration to Mexico City also is "conditioned by the need to cover a constant deficit in the family budget," and has substituted for migration to the U.S. in the region (Arizpe, 1978: 246).

The wages from the different forms of off-farm employment obviously vary greatly, and must be adequate to provide support for members of the family while they are not living on the farm. Often whatever surplus is left over after this necessary level of income is reached is contributed to a common family fund, which enables the laborer to share in whatever commodities are produced on the family farm. In Michoacán, Dinerman finds "all of this cash income is 'pooled' into a household budget" (1978:

495). Wiest (1970: 159) notes a strong correlation between wage-labor migration and multiple contributions of income to the household. This is true not only for households whose members migrate within Mexico, but also for those households which exhibit U.S. migration. Considering the great disparity in wages between Mexico and the United States, one might suppose that a higher incidence of U.S. migration would substitute for different forms of wage-labor migration within Mexico and thereby reduce the number of off-farm sources of income. The opposite results emphasize that migration to the United States is often only one of the many types of wage-labor migration engaged in by the same household.

Mexican migrants to the United States have been found to remit over one-third of their U.S. earnings to dependents at home (Cornelius, 1978: 45). Their high degree of integration with the rural household in Mexico underscores the error of considering each border crossing to be a permanent entry into the United States. As Cornelius concludes, "the weight of the evidence clearly indicates that the majority of Mexicans who now migrate to the U.S. illegally do not aspire to permanent integration into U.S. society" (1978: 28). Continuing links between permanent migrants to the urban areas of Mexico and their home region have also been commented upon in a number of studies (Balán, Browning, and Jelin, 1973; Butterworth, 1970; Kemper, 1973; Orellana, 1973).

Multiple sources of cash income despite a clear hierarchy of wages and the pooling of this income into a common household budget demonstrate that a primary factor in household labor allocation is income stability and reduction of uncertainty. This process and its influence upon migration will be developed in the next section. First, a simple model of labor allocation without risk will be presented.

3.3.3 A Model of Household Labor Allocation Without Risk

Several obvious considerations in the allocation of household labor in the peasant mode of production are the quantity of farm output produced on the family plot relative to wages from off-farm employment, the relative costs of different forms of off-farm employment, including transportation, search-costs and the cost of support of the migrant, and the total amount and distribution of time which the family can devote to on-and off-farm employment. This latter factor, and farm income, will be determined by land size and crop composition relative to the size of the family labor force and hired labor. The cash needs of the family and the total income that can be received from off-farm labor are also important factors.

The influence of these various relationships can be demonstrated graphically, although the complexity of seasonal patterns of agricultural production may be only crudely approximated by this method. Figure 2-1 presents a simple

illustration of the allocation of household labor between farm labor and three types of off-farm employment.

The family is assumed to have two members in the labor force, permitting a total of 24 months of labor to be allocated to on- and off-farm employment. For simplicity, the amount of on-farm family labor (T_f) is assumed to be given by land size, crop composition and agricultural technology, and is represented on the graph by the dashed line $\hat{T}_f - \hat{T}_n$. On-farm labor is measured in non-coincident labor-months, so that if some calendar months require more than one labor-month per laborer, agricultural production on the family plot will depend upon hired labor or labor of the wife, children and relatives. Thus the family will have \hat{T}_n months to allocate to different types of off-farm labor.

In addition to the demands of family agricultural production, another constraint upon the allocation of total family labor is the necessity of a certain minimum level of cash income above the marketable surplus of agricultural production. This level, shown as Y_{min} , may indicate that the allocation of family labor include some level of participation in higher-paying occupations. This is illustrated in Figure 2-1, where the allocation of all available time to agricultural labor in Mexico would be insufficient to derive an income of Y_{min} . Moreover, Y_{min} would be dependent upon T_f to a point, and could be expected

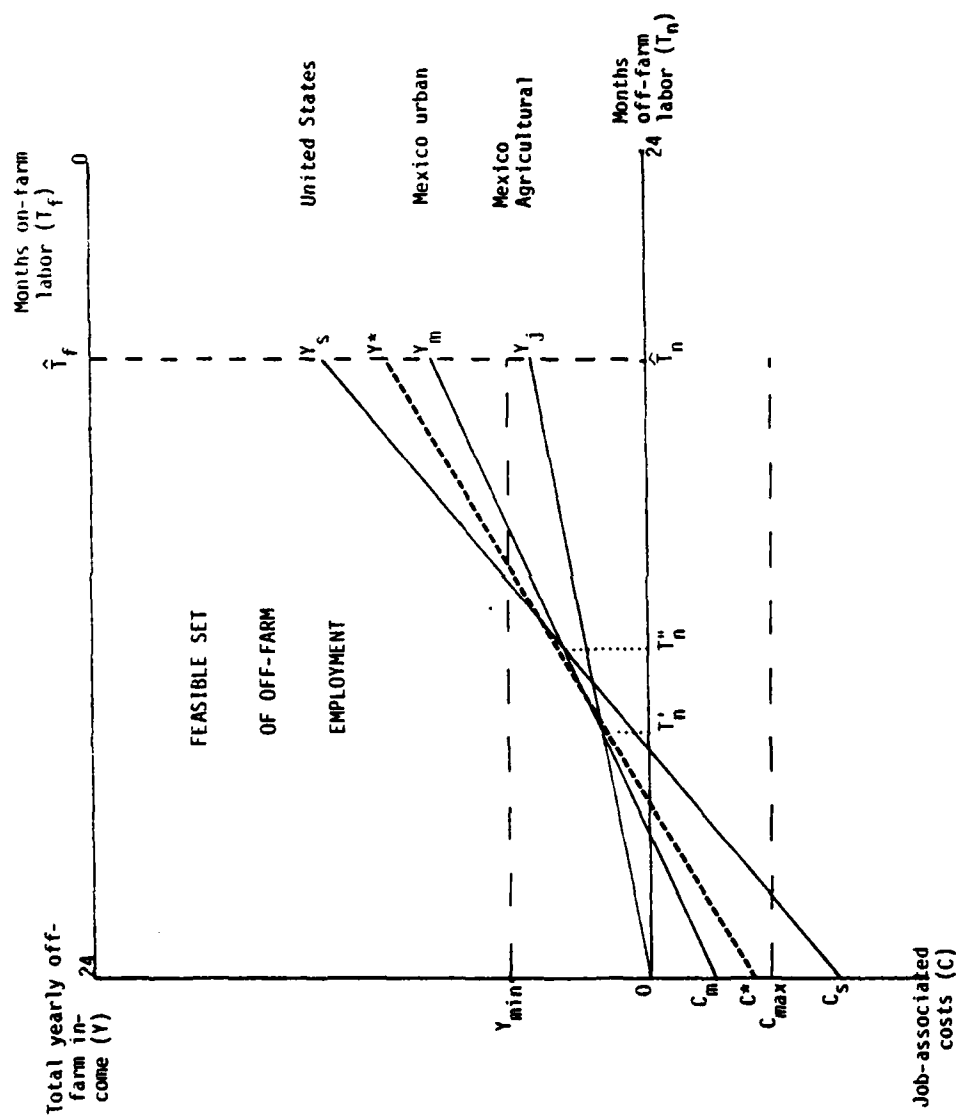


Figure 2-1
The Constrained Set of Household Labor Alternatives

to rise significantly as T_f fell due to a decline in subsistence production or a rise in hired labor.

Three different types of off-farm labor are assumed to be available: work as an agricultural day laborer (jornalero) living on-farm; work in a nearby urban area of Mexico involving daily or weekly commuting; and migration to the United States. If all available labor were allocated to jornalero labor for the period \hat{t}_n , total off-farm income would be Y_j , and if all were devoted to labor in the United States, total off-farm income would be Y_s .

Each of these types of off-farm labor also has an associated cost: the cost of jornalero labor is placed at zero, because the laborer is assumed to live on the farm (or other job costs can be normalized to these as a differential). A job involving commuting to an urban area has a cost of C_m , representing wages foregone and other expenses of the job search, and migration to the United States has a cost of C_s , which includes transportation, the fee charged by coyotes, and the wages lost before employment is gained. The sum of these costs over the occupational mix selected by the family cannot exceed C_{max} , the resources available to the family which can be spared to meet job-associated costs (borrowing is excluded by assumption). Transportation expenses associated with daily or weekly commuting and differentials in living expenses are deducted from wages because they do not represent up-front fixed charges.

The amount of fixed costs and the wage rate define two points for each type of employment -- a break-even point where the income line crosses the horizontal axis, and the point where it crosses the income line of the next most remunerative type of employment (T'_n or T''_n). The slope of each of the income lines ($C_s - Y_s$, $C_m - Y_m$, and $0 - Y_j$) is the real wage after subtracting ongoing job-related costs of each type of employment.

This graphical exposition, simple as it is, incorporates several of the important factors in the allocation of household labor into the constraints and relationships presented. The amount of available labor is a function of the age and sex composition of the household, while the constraint defining the necessary quantity of on-farm labor incorporates the size of the family plot (given by the regional mode of production) and the system of agricultural technology, including the type of land, whether it is irrigated, crop composition and the technique of production. The necessary level of off-farm cash income is determined by the subsistence needs of the family, purchased agricultural inputs, and the value of the marketable agricultural surplus. Subsistence needs depend partly upon family size, yet also have a cultural dimension. Other regional factors, such as the possibility of handicraft production, market vending, and non-wage labor arrangements between peasant

producers are also important in determining the cash needs of the household. These factors will depend upon the level of penetration of capitalist relations in the region, and their relationships developed with more precision at the conclusion of this chapter.

Total yearly off-farm income will be the sum of the incomes earned in the various types of off-farm employment. If the household allocates labor equally between jornalero employment and labor in the United States, the income line $C^* - Y^*$ will define both total income and aggregate household off-farm wage rate. This combination provides less income than would the allocation of all available labor to U.S. migration, but it does so at a smaller fixed cost. As drawn, the cost associated with the allocation of both members to U.S. employment would exceed the family's resources, constraining them from choosing this alternative.

As formulated, a household attempting to maximize income would allocate as much labor as possible to the highest paying alternative within the constraints of time and costs. In fact, if each of these types of employment generated an income stream which was known with certainty, the failure to provide for borrowing any amount of money to overcome the cost constraint would be a major flaw of the model. There are, however, uncertainties attached to each of these income streams, and the model has implicitly assumed that the income variables are

defined in terms of their expected values. The next section will make these uncertainties and their effect upon the household allocation of labor explicit.

3.3.4 Risk and Security Maximization by the Peasant Household

The peasant household allocates its members to different labor activities and economic sectors, diversifying its income sources, in order to reduce the variability of income through unemployment in any one occupation. The process has been alluded to in several studies of rural wage labor: White (1976) speaks of "occupational multiplicity" in Java, Breman (1977) of "shared employment" in India, and Arizpe notes that over one-third of the poorest strata of farm households in Toxf, Mexico had two or more people in different occupations (1978: 154). In Oaxaca, Beals observes (1975: 52):

Rarely are the economic roles of each member identical, and such households are buffered to some extent from economic accidents or temporary reductions in income that may befall one role or another. Very often the head of the household considers himself in charge of all the family members with their respective roles.

Given the costs of foregone income, even education becomes part of household labor allocation. Murphy comments (1979: 9):

A pattern is often seen in less developed countries where households in the lower economic sectors will undertake a mixed strategy in which education will be given to one individual, while the remainder of the group work in the tertiary, or informal, sector of the economy.

The concept of diversification has both a strong theoretical framework (Markovitz, 1959; Sharpe, 1970) and wide-spread practical application to many economic activities. It is based upon differences among the probabilities of outcomes of various alternatives as conditions change, whether they be prices of different stocks in a market decline or availability of employment in different regions and occupations in an economic slump.

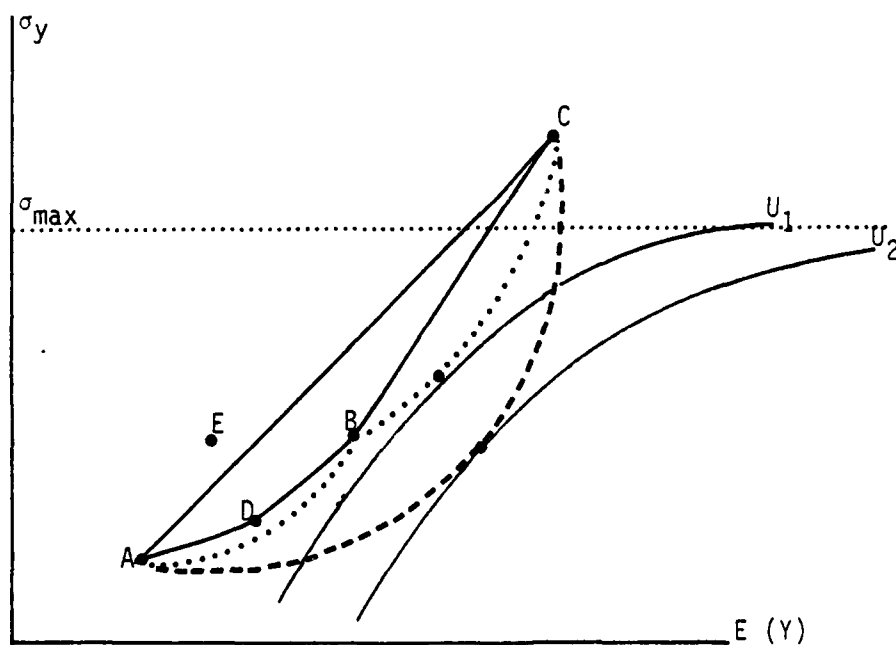
Each occupation has associated with it a distribution of possible incomes for any amount of time which might be devoted to it, including the production of the subsistence and/or commercial crop. The distribution of occupational income is affected by international, national, and local economic conditions, and seasonal and political factors. Local agricultural labor may be both hard to obtain and subject to sharp cyclical fluctuations, while wage income in the United States is dependent upon the probability of apprehension and may produce the widest potential variation.

The household will allocate labor by two criteria: the lowest degree of uncertainty for any expected level of income, and diversification among activities which react differently to change. In the common economic terminology applied to the analysis of uncertainty, the household is risk-averse -- it will accept increasing uncertainty of income only if the expected returns increase more than proportionally. The

hypothetical risk-return relationships for five different occupations, and their interaction with the household's maximization principle, are illustrated in Figure 2-2.

FIGURE 2-2

Occupational Diversification by the Peasant Household



Occupation A, which could be local agricultural employment, has both a low value of expected income and a low degree of uncertainty. Migratory wage labor in Mexico (occupation D) increases income at only a slight increase in risk (dimensions

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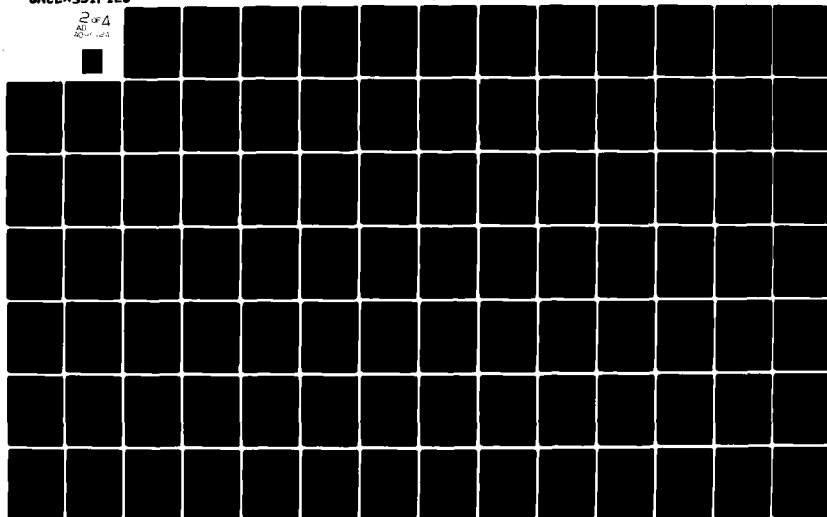
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of personal preference apart from the risk-return relationship cannot be graphically expressed and would certainly influence this choice). Occupation B is assumed to be urban unemployment in Mexico, providing considerably more income at a cost of greater uncertainty, and migration to the United States (occupation C) inflates both risks and potential returns. Utility functions U_1 and U_2 are exhibited representing household preferences between higher expected income and higher risk, and flatten out at a critical level of risk σ_{\max} , representing the maximum income uncertainty the household will endure.

Certain occupations are eliminated by simple decision rules. Occupation E has less income than B at the same level of uncertainty, and so no labor would be allocated to this alternative. Nor would all household labor work in the U.S., as this would incur an unacceptable level of income uncertainty. Upon elimination of these forms of labor allocation, however, decision rules become more complicated. Not only must the risk and return of each alternative occupation be evaluated, but also the relationships among their potential returns as conditions change.

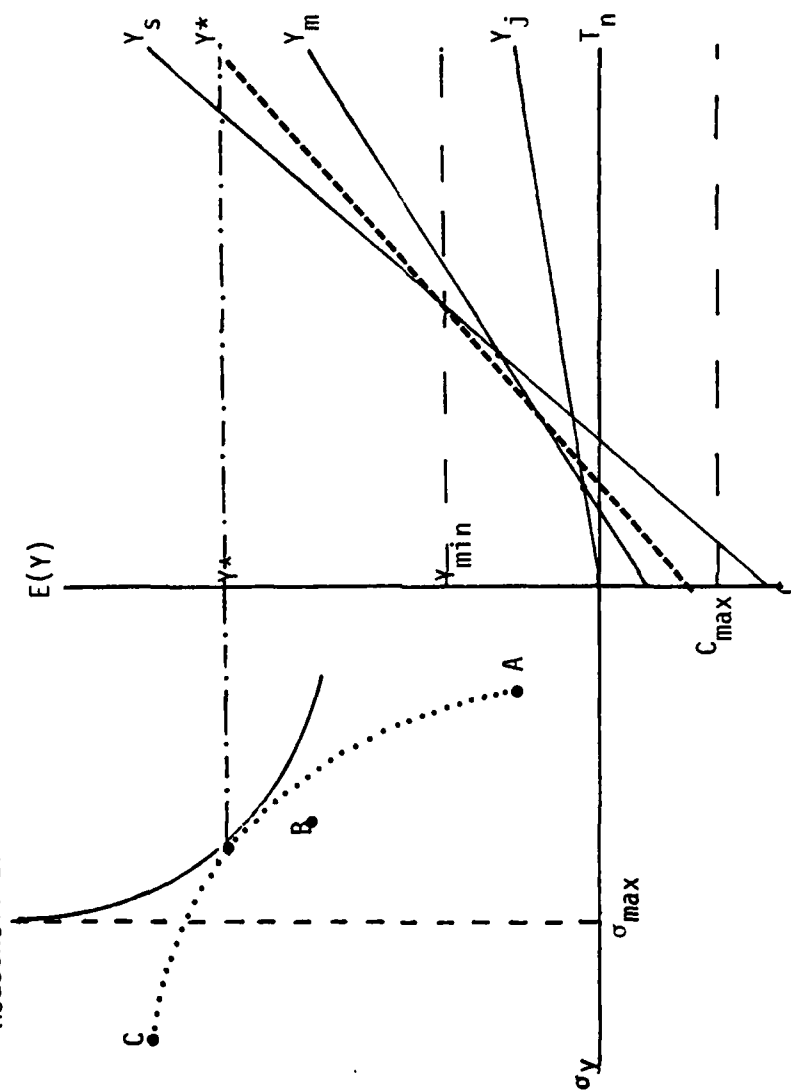
If the returns from jornalero income were perfectly correlated with the returns from United States wage labor, the risk-return relationship of any specific allocation of labor between these alternatives would be in direct proportion

to this allocation. Graphically, it would determine a point along the straight line AC. Less-than-perfect correlation would cause this line to bulge out, providing a greater expected return for a given level of risk. The household in Figure 2-2 would prefer (be on a higher utility function) the combination of AB over D, and AC over D or B or any combination of these two. They would allocate labor in some combination between jornalero and U.S. employment. Of course, as presented graphically only two occupations can be combined, but the points can easily be redefined to represent portfolios of occupational mixes (Sharpe, 1970).

Figures 2-1 and 2-2 can be combined to represent the constrained alternatives and their attached risks, as illustrated by Figure 2-3.

The household must choose an off-farm employment mix which provides income of at least Y_{\min} at a cost of no more than C_{\max} . Within this constrained set, the household will allocate its available off-farm labor to minimize the risk associated with any level of income, or maximize the income associated with any level of risk. For families living on

Figure 2-3
Household Labor Allocation Alternatives with Uncertainty



the margin of existence, a maximum tolerable level of uncertainty σ_{\max} may be the factor which determines the pattern of labor allocation.

The graphical presentation above is useful in that it highlights the factors which influence the peasant household's choice of wage-labor alternatives. Relative wages are certainly important variables, but their influence is felt only within the context of associated job costs, the minimum necessary level of off-farm income, the resources of the household that are available for job search and related costs, and above all, a strategy of risk-minimization by the household.

We may now address the question of the influence of the complex array of regional factors which affect the position of these constraints, and of the relative weight given income and risk by the peasant household. The effect of the penetration of capitalism upon the need for supplementary off-farm income has already been examined. The role of the peasant as wage laborer was emphasized, though a distinction was maintained between peasant wage laborers with land and a pure rural proletariat without land. Is this distinction likely to be important on the basis of the factors highlighted above?

Landless laborers may be influenced in their labor allocation decision by the lack of a potential income. Their monetary needs as a class will be higher than poor landed farmers, for they do not possess land and the resulting low

but relatively certain return from subsistence agriculture. Thus these two constraints may tend to work against one another -- the high cash requirements dictating a risky employment mix, but this mix entailing high job costs which are constrained by the scarce resources of members of this class. Brown (1975) found that landless laborers who had engaged in seasonal migration to the United States saved more of their income than did ejidatarios, indicating a desire to make the most of this costly and risky alternative. Other support for the hypothesis that landless laborers differ in their labor allocation is given by Dinerman's study of a village in Michoacán. She found that "The landless, those without the resources to build and maintain wide social networks linking them to other households...do not sponsor migrants" (1978:498).

The role of migration to the United States must be analyzed as it fits into the peasant household's overall strategy of constrained risk minimization. First, the riskiness of the income stream associated with United States employment must be compared with that of alternative sources of income. Certainly the probability of apprehension by "La Migra" (The INS) plays an important role, affecting job search time and related costs. If funds allocated to this alternative are exhausted without a successful entry, the potential migrant might be forced to return to his home community without having earned anything. Thus, while repeated entry attempts usually insure that most migrants

eventually cross the border and find a job (Cornelius, 1978), the budget constraint may effectively limit these attempts.

Having gained entry, however, the uncertainty of wage-labor income in the United States might well be less than that of some other off-farm activities in Mexico. Half of Cornelius' sample of migrants said employment could be found quicker in the United States than in urban Mexico. Given the importance of risk to the household allocation of labor, an understanding of the process of migration could be significantly expanded by focusing on the perceived probability distributions of each of the income streams resulting from the various types of off-farm labor.

The relatively large amount of cash which can be accumulated through migration to the United States itself plays an important role in the minimization of household risks. Dinerman observed networks of reciprocal relationships among households in Michoacán which provided cash loans to each other to meet family emergencies. She found, "Each household attempts to create a large network of economic allies" (1978: 496), and thereby minimize the effect of a calamity which occurs within any one household. Migration to the United States was found to be an important way to obtain the cash necessary to participate in this network.

Risk-minimization also plays a role for the household member who permanently leaves the family farm to migrate to an

urban area. In Ghana, Hart says that permanent migrants "conceive of themselves as temporary absentees with a long-term stake in joint property and the village community" (1974: 329). Contributions of money and labor are a means of maintaining these ties, and thereby of retaining a position in the rural household which will provide security from the adverse effects of complete dependence upon urban sources of wage labor. In the village in San Mateo Almoloa, near industrial Toluca and Mexico City, many men work permanently away from the community, but "those men who wish to remain part of the village return from their work in the city to work on the land during the important agricultural cycles (Friedland, 1971: 125). This form of "permanent" migration provides cash and labor at critical times to the rural household, thus playing a pivotal role in allocation of labor by the farm household, while at the same time providing a measure of stability to the migrant and his family.

An interesting hypothesis may be drawn from the maintenance of family ties by urban migrants, and by the fact that rural households in Mexico and many other parts of the world undertake a diversified strategy to maintain their rural residence rather than migrate to the city. It appears that life in the city is generally considered riskier than rural life. The village networks maintained by rural households protect them not only from economic adversity, but also from

a variety of risks such as crime, extortion, and "legal" exploitation, especially that associated with obtaining a secure title to the urban plot of land. This hypothesis is indirectly supported in an unusual area of Oaxaca known for violent blood feuds, banditry, and economic exploitation. People from this region have predominantly engaged in permanent migration to Mexico City, rather than alternatives which would permit them to continue to live in the region, partly because "life is much more secure in Mexico City than in Tilantongo" (Butterworth, 1970: 111). Nevertheless, village networks of reciprocal household relationships by these migrants are frequently transferred to the city to reduce the risks of urban life.

3.4 Socio-Cultural Factors, Household Composition, and Wage-Labor Migration

This chapter has analyzed some of the factors determining the allocation of household labor to on- and off-farm activities, including their articulation to the capitalist economy, their position in the regional agricultural system, and a strategy of risk-minimization which tends to diversify employment sources. The emphasis upon economic factors has been a result of the dynamic role played by the development of the capitalist mode of production and its effect upon the allocation of peasant labor. However, the fact that the household is the principal actor in

this allocation necessitates explicit consideration of non-economic household factors.

Since the allocation of household wage labor to meet the requirements of survival at a minimum level of risk is based upon the principle of diversification, it is clear that the degree to which this may be obtained is partly dependent upon the size and composition of the household. Chayanov (1966) emphasized family composition in determining on-farm allocation of labor, and given a common household budget, the same principles apply to the over-all allocation of household labor.

The concept of the family in many rural contexts must be broadened to adequately describe the interchange of labor roles which it permits. Archetti and Stölen's regional investigation in Argentina employed the term "domestic group" to describe this unit, defined as "a system of social relations based upon the principle of a common residence which regulates and guarantees the productive process" (1975: 51). After investigating several possible concepts for his unit of data collection, Barbosa-Ramírez (1979) settles upon a similar definition as the most relevant for analyzing rural employment, although he also includes individuals who do not live with the household, but who contribute cash or labor.

A number of studies mention the importance of the composition of the extended household for facilitating long-term absence of working members. In India, Eanes says, "married

males are enabled to leave the village because of the security provided by the joint family" (1967: 170), and Connell asserts "the broad structure of such families allows and encourages the migration of one of its members as a means of spreading the family's investment opportunities" (1976: 47).

Particularly important in determining the potential for wage-labor migration is the necessity of meeting farm labor needs. Wiest found that "migration is likely to occur only if there are adequate adult hands capable of meeting the requirements of household logistics during the absence of the laborer. The data provide reason to believe that this is most important for households involved in migration to the United States," because of the impossibility of short-term return by migrants to meet critical farm labor needs (1970: 126). Cornelius (1978: 49) found that only 19 percent of landowners in Jalisco had left their land idle when migrating to the U.S., and that over two-thirds had left their parcel in the care of a relative. In Michoacán, Dinerman observed that "in households of a young married couple with several small children, the young husband or the youngest son residing with aging parents will prefer either seasonal migration to the tierra caliente or a year's stay in Mexico City (six hours away by bus) to the United States" (1978: 497).

Labor of women and children of the household is often a substitute for male labor in farm production. On the basis of

his observations in Java, White concludes, "under conditions of low labor productivity and extreme occupational multiplicity in the household economy, the economic advantages of large families lie not only in the provision of old-age security to parents (a factor recognized by many authors), but also in the economic contribution of children from an early age" (1975: 286). The family may also respond by shifting farm production to a crop requiring less labor, at least during critical periods. The Bemba of Zambia shifted from a cash crop, millet, to cassava, a subsistence crop, in order that the women and children could continue production while the men were away (Cliffe, 1977). This shift would also tend to reduce risk by providing a subsistence staple in addition to a source of cash income.

It is important to emphasize that household composition is not a parameter fixed in time, but responds to the regional necessities of household survival in the peasant mode. Nutini and Murphy observed an impressive increase in wage-labor migration in a rural area near Puebla during the period 1959-1965, and concluded, "the most important consequence of labor migration for the structure of the family is that it has increased the incidence of the extended family household" (1970: 97). Over half of the households in the region are now part of extended-family systems, a rise of 10 to 15 percent over the 8-year period. These findings tend to confirm two important

hypotheses: that the peasant mode of production is not disappearing, but rather is merely changing its form as a result of the penetration of capitalism' and that these changes may even cause a strengthening of the "traditional" aspects of peasant society and production. Lomnitz summarizes this position (1975: 12):

Although it uses social relations of a traditional nature (the family, compadrazgo, and friendship networks), this system is not merely a form of primitive and obsolete economic mode, but constitutes an evolutionary response, vital and enduring, to the extreme conditions of a marginal existence.

The critical role played by the extended household in the allocation of labor and migration make it imperative to study the society which sanctions these forms of household and inter-household relationships. This is particularly true for a country such as Mexico, which exhibits a variety of indigenous cultures. Barbosa-Ramírez says, "we are...confronted with a decision about the allocation of labor within the productive unit which is not only related to the family as such, but is also linked to the social organization to which it belongs" (1976: 223).

The influence of such culturally related variables as language on labor allocation and migration is obvious. Butterworth states unequivocally that "monolingual males do not migrate" from the Mixteca Alta region of Oaxaca (1970: 110).

Cone (1976) observes that the Tarascan Indians of Michoacán do not engage in labor migration with the same frequency as do mestizos. Brandes (1975) notes that temporary or circular migration of males from agricultural households is unacceptable within the cultural milieu of central Spain. In Oaxaca, the influence of cultural variables was so persuasive that Barbosa-Ramírez took as his unit of analysis the cultural group (1979: 8):

In the Mixteca Baja we found, at least for the two subsistence groups, the Indian and the Black, the primary unit of analysis could not be taken as the family in its restricted sense, considering it as a unit of 'individuals' or 'isolated' decision-making, but it had to be integrated into a more complex form of social organization constituted by the community to which it belonged.

The variety of influences of cultural factors upon household labor allocation underscores the relevance of the regional level of analysis. In a culturally homogeneous society it is acceptable to abstract from cultural influences, but models developed for social processes in those societies cannot be directly applied to culturally diverse groups such as are found in Mexico.

4. A REGIONAL MODEL OF HOUSEHOLD LABOR ALLOCATION

This chapter has discussed a variety of factors which influence the allocation of household labor in the peasant mode of production. Some of these factors, such as soil type or

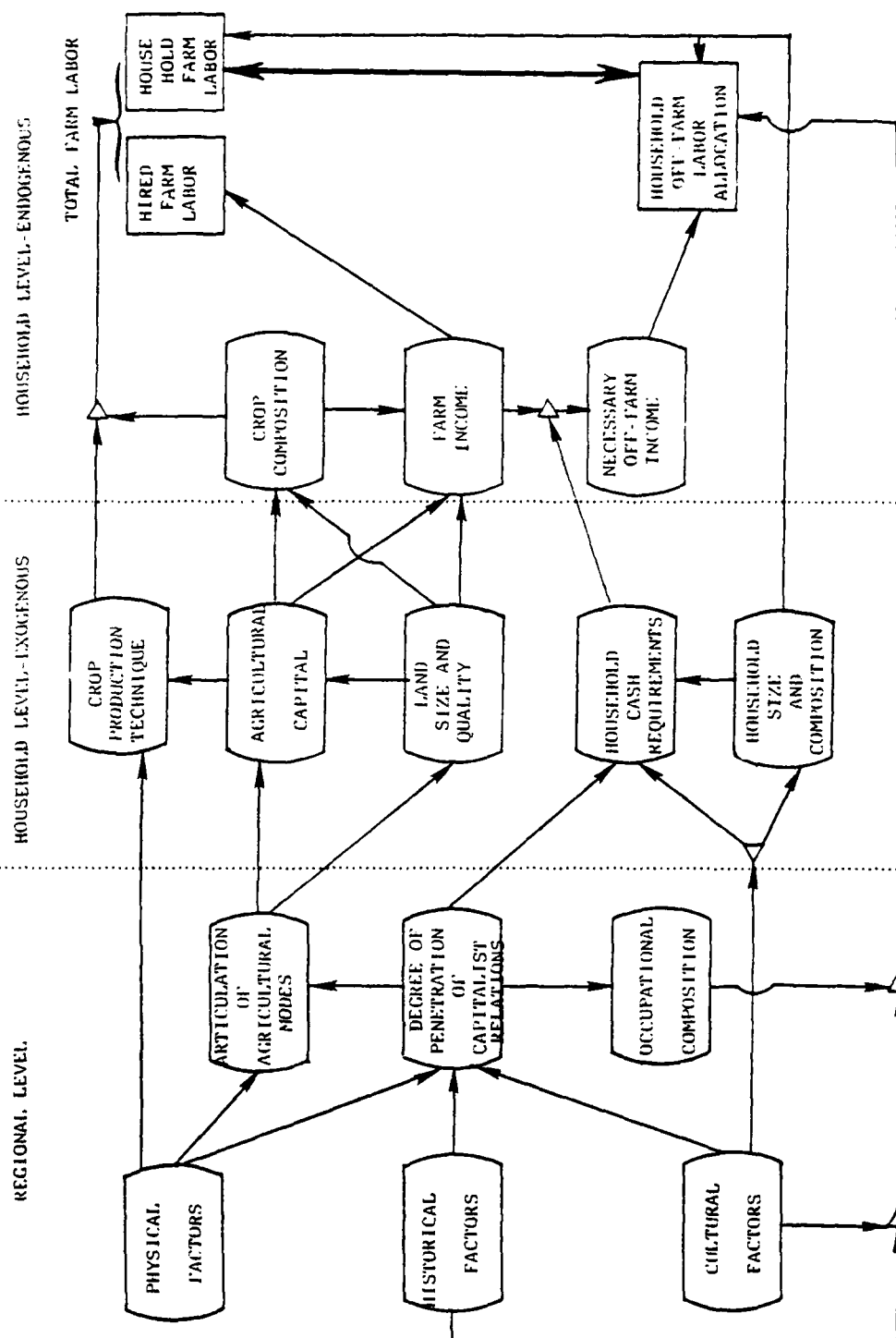
regional occupational composition, operate predominantly at the regional level, while others, such as land size or household composition, vary among households. Operating together, these factors determine the need for off-farm sources of income and the allocation of household labor to secure this income at the lowest level of risk.

The relationship among factors influencing the allocation of household labor is thus extremely complex, and in order to derive testable hypotheses about the causes of off-farm labor and migration, and the differences in labor patterns exhibited by different households, it is necessary to reduce this complexity. Based upon discussion in the previous section, Figure 2-4 portrays the basic relationship among regional and household variables affecting regional patterns of labor allocation.

Variables are divided into regional-level variables and household level variables, and the latter into those exogenous to the household and those which are the result of household decisions. Thus physical factors are exogenous to the region, land size is exogenous to the household, and the division of farm labor among the family and hired workers is the result of a decision process at the household level.

Starting at the regional level of analysis, we will trace through the factors which influence the pattern of household labor allocation. Taken as exogenous are the physical,

Figure 2-4
A Regional Model of Household Labor Allocation



historical and cultural characteristics of the region. Together, these factors have determined the degree of penetration of capitalist relations, both in the agricultural sector through the form of articulation of modes of agricultural production and in the non-agricultural sector. In areas with a low degree of penetration of capitalist relations there will generally be a few local opportunities for employment outside of agriculture, and many necessities may be obtained through the subsistence economy. However, a high level of penetration of capitalist relations does not necessarily imply dominance of agriculture by commercial production. Physical factors directly influence the articulation of agricultural modes, so that an area like Toluca, though highly integrated into the market economy, is dominated by subsistence agriculture because no commercial crop can be profitably grown.

Narrowing the focus from the region to the household, two sets of factors which are determined by these regional influences can be distinguished. These are factors relevant to the household as a domestic unit -- size, composition, and consumption requirements -- and those relevant to the household as an agricultural production unit. Cultural factors are the predominant influence upon household size, composition, and consumption patterns, although the latter are directly

related to the relative availability of traditional and market-produced commodities.

The major variables which define the capabilities of the household as an agricultural production unit are land size and quality, particularly whether it is irrigated or not, and the amount of agricultural capital employed, including method of traction and use of purchased inputs. These factors together determine the technique of production for each crop grown which the farm unit may employ. Farms in the peasant mode possess poorer land and fewer agricultural implements, and so employ traditional techniques of production, while those in the capitalist mode will be larger and cultivated with machinery and purchased inputs.

These variables have their major influence upon farm labor use per hectare through their effect on the composition of crops, or cropping patterns. Crops differ not only in their absolute labor requirements, but also in the distribution of this labor over the year and the type of work which is required. In peak seasons, household labor may be insufficient to perform the activity, and it becomes necessary to hire labor. Thus crop composition directly affects the division of farm labor into household labor and hired labor.

In Figure 2-4, crop composition is shown as endogenous to the household decision unit, but within the peasant mode it is often completely determined by land size and quality and the

technique of production. In much of Mexico, corn is the major grain because it may be cultivated with regularity on poor, unirrigated soil with few inputs other than household labor and animal traction. On irrigated land, or land which receives adequate rainfall, a variety of crops may be grown. In this instance, crop composition is determined mainly by the requirements of purchased inputs (including labor) of the different crops relative to farm size, agricultural capital, and household size and composition, and their relative market values.

These relationships are portrayed in the division of total farm labor into household and hired labor. The influence of land size and agricultural capital is felt through crop composition, crop production technique, and farm income. Thus the ratio of hired labor to farm labor is influenced not only by what crops are grown and their seasonal labor requirements relative to household labor supply, but also by the income produced by the different crops. Laborers will be hired to work a crop only if the crop produces enough income to cover their wages.

The amount of household labor allocated to farm production also influences, and is influenced by, the allocation of household labor to off-farm activities. The simultaneity of this allocation cannot be overemphasized. Household off-farm labor is not the residual between total farm labor and household labor supply, but is part of a simultaneous decision

concerning crop composition, household farm labor, and hired farm labor. It is also directly affected by the necessity of off-farm income, and by regional variables such as sectoral labor force composition and cultural factors. The uncertainty of various off-farm sources of income relative to their expected returns, discussed earlier, is one of the major criteria by which the allocation is made among these alternatives.

The relationships outlined above and portrayed in Figure 2-4 provide a model of labor allocation which is consistent with available evidence and capable of being empirically tested in agricultural regions of countries like Mexico. From the beginning, the empirical analysis must incorporate the major features of the model; the level of analysis, unit of analysis and unit of data collection. Regions must be defined small enough to attain homogeneity in the influence of physical, historical, and cultural factors, yet large enough to incorporate the regional labor system, including daily or weekly commuting. Within this region, the sample should consist of households from the peasant mode of production, although data on farms in the capitalist mode should also be included to capture this source of demand for labor from the peasant mode.

The empirical analysis will proceed in two stages. The first will be to test the relationships developed in the model at the regional level. The major variables to be explained

are farm income, on-farm labor and its division into household labor and family labor, and off-farm household labor, including migration. The direction of some of the relationships is predicted in the model without regional specificity. Farm income is directly and positively related to land size, agricultural capital, and the amount of land in the commercial crop. It also positively influences the relative quantity of hired farm labor, though the effect of crop composition cannot be specified without making explicit the seasonal labor requirements of the predominant crops in the region. Off-farm household labor will depend upon two factors -- the necessary amount of income to be earned and the household labor available to do it. The first is negatively affected by farm income and positively by household size, while available household labor is positively affected by household size and negatively by farm labor requirements.

If the relationships between agricultural variables, farm income, household size, family/hired farm labor, and off-farm labor are found to be significant at this stage of the analysis, then the model adequately captures the influence of major variables influencing on- and off-farm labor patterns. If differences in patterns of off-farm labor allocation are observed among households, they may be related to these variables and to other household

factors, such as education and land tenure, to determine the relative influence of these variables upon labor allocation. It is at this stage of the analysis that the strategy of risk minimization by households in different economic circumstances can be addressed. Analysis at the regional level thus permits a wider perspective to be formulated on the question of who migrates and why.

However, given the relative homogeneity of the peasant mode of production within any one area, larger differences in patterns of labor allocation should be observed between regions than within regions. The second stage of the empirical analysis will examine the effect of these regional factors, particularly the articulation of modes of production and penetration of capitalist relations, upon off-farm labor patterns. The amount of off-farm labor is expected to vary directly with the degree of subordination of the peasant mode to the capitalist mode, and the variety of types of off-farm labor to be dependent upon the integration of the region into the national economy. Cultural influences upon household composition and labor allocation may also be examined at this stage of the analysis.

The goal of the empirical analysis of the next five chapters is thus twofold: to test the basic model of labor

allocation developed in this chapter, and to create a typology of conditions which determine the types of off-farm labor chosen in different regions. No specific hypotheses concerning this typology have been developed, for there is as yet no given set of facts to explain. We must observe the prevalent regional patterns of off-farm wage labor, whether they include local agricultural labor, circulatory migration, or migration to the United States, and examine the role of each as in income producing and risk minimizing strategy for the peasant household.

CHAPTER III

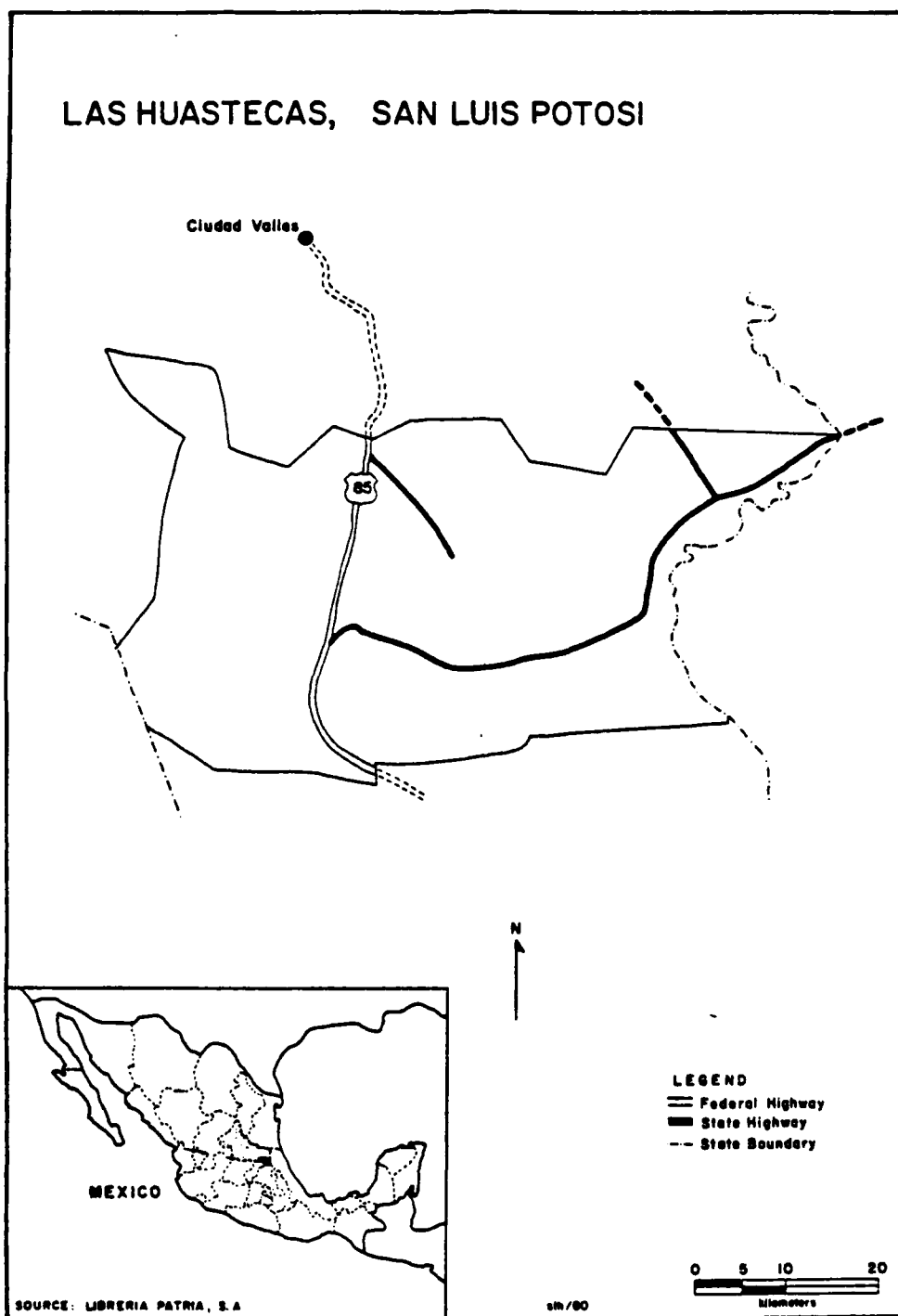
LAS HUASTECAS, SAN LUIS POTOSI

The zone of Las Huastecas is located in the southeast portion of the state of San Luis Potosí. Situated in the hills of the Sierra Madre Oriental, it is far different from the arid capital from which the state takes its name. It is a semi-tropical region composed of nine municipios: Aquismón, Ciudad Santos, Coxcatlán, Huelmetlán, San Antonio, San Vicente Tancuayalab, Tampamolón, Tanla-jás, and Tanquián de Escobedo. The predominant population groups are indigenous--Huastecos and Otomís. Only 350 miles from the Texas border via the old Pan American Highway, it is characteristic of indigenous zones found much further south, for it is predominantly agricultural, with low literacy and standards of living. It should therefore be interesting to see whether poor farmers from this zone include U.S. migration among their options.

1. CHARACTERISTICS OF THE REGION

1.1 Physical Factors

Las Huastecas is typical of zones on the slopes of the eastern range of mountains in Mexico. It receives abundant rainfall, about 1,500 millimeters (60 inches) per year, and therefore permits crops to be grown year-round without the necessity of irrigation. Over one-third of the dominant crop, corn, is grown in the winter, while coffee and sugar cane, the other two major crops, are



grown year-round. Together these three crops constitute 80 percent of the cultivated acreage. Yields of major crops are shown in Table 3-1. Of the total of 253,670 hectares in the zone, 51.7 percent was agricultural, and only 26,018 hectares were in crop production. This gives an idea of the importance of livestock, but this activity is confined mainly to the larger private farms.

TABLE 3-1
Yields of Major Crops: Las Huastecas
(kg./ha. 1976-1977)

Coffee	282
Sugar Cane	3,445
Beans	585
Corn (summer)	893
Corn (winter)	782
Tomato	6,400
Oranges	40,170

Source: Barbosa-Ramírez, 1978.

1.2 Demographic and Cultural Factors

In 1970 the total population censused in the zone was 98,804 persons, with an average density of 38.9 persons per square kilometer, though varying from 24.7 to 106.6 among the nine municipios. The indigenous nature of the population is indicated by the fact that over 50 percent spoke an Indian language, and 13 percent of the persons over 15 years old spoke no Spanish at all.

The level of education is also low; one-half of the population over six years old had no formal education, and the average number of years of schooling per person in the sample was only 2.2.

Most of the indigenous population live in a series of small communities connected together by a common center where the civil and religious authorities live. Both private and ejidal forms of land tenure are common, and the latter, along with a form of community ownership, accounts for 42.7 percent of the 237,785 hectares in the region and a larger proportion of the farm population, according to the Agricultural Census of 1970.

Living standards are low, even by rural Mexican standards. The common dwelling consists of a hut with a straw roof and dirt floor. Seventy-five percent of the homes censused in 1970 had no running water, while only 18.9 percent had electricity. The daily diet usually consists of corn tortillas and beans; meat is rare, with only 2.9 percent of the persons consuming meat on a daily basis.

In the sample of 98 farms the average household had 6.5 persons, comprised of people living under the same roof and those in the immediate family who, by contributing work or money, formed part of the "domestic group".* In the average household, slightly

*Barbosa-Ramírez investigates, in the course of field work in the six zones, several possible definitions of the relevant unit of household labor allocation. After a thorough review of the inadequacies of each, he finds the concept of "domestic group" used in Las Huastecas to be the most relevant for labor allocation decisions.

over one-half of the persons were 16 years old or more, and thus potential members of the labor force.

1.3 Economic Factors

Agriculture forms the basis of the regional economy of Las Huastecas. The labor force is 27 percent of the total population of 98,804 persons, and agriculture employs 81.5 percent of these people. There were also 430 commercial establishments in the zone in 1970 employing 830 people, and 1,524 "manufacturing" establishments with 3,873 employees. The primary activity of these small establishments was the processing of cane into a crude form of packaged sugar called piloncillo. This product is sold through intermediaries to nearby markets in Tampico and Ciudad Valles, and some reaches Monterrey, the Bajío and Mexico City.

The commercial nature of sugar cane and coffee, the two principal crops in addition to corn, indicates a degree of articulation of this zone with the national economy which might seem contradictory with the traditional methods by which these crops are cultivated and the standard of living of the population. Little capital or purchased inputs are used in cultivation, and typically a machete and hoe are the principal agricultural implements, although tractors may be rented for some tasks. Most agricultural capital, 83 percent of the total value, is in animals, which provides the main means of traction for cultivation.

There is a clear distinction between private and ejidal property regarding the type of land and the use to which it is put. Barbosa-Ramírez comments: "the Indians have the worst land, because they have been constantly pushed off of the best land to the mountainous regions" (1978:11). Possessing large tracts that require considerably more labor than could be cultivated by the household, private farmers have allocated over three-fourths of their land to pasture for raising livestock. In contrast, ejidal land is used mainly for crop production of both a subsistence and commercial nature.

The production of coffee and sugar cane may be viewed more as a supplementary source of cash income for subsistence farmers than as a commercial operation. As we shall see, most farmers in our sample grow corn as their primary crop. Moreover, due to the primitive condition of the roads, lack of transport, and the subordinate position of the indigenous population to the commercial economy of the towns, little of the ultimate value of this production is transferred to the cultivator. The type of articulation therefore bears closer similarity to a tropical export enclave, in which the only link to the commercial sector is the marketing of production, than to a closely integrated commercial agriculture, in which links include not only marketed output but also capital and purchased inputs.

2. FARM INCOME AND LABOR USE

The data in this and the following section is based upon a sample of 480 farms from the ejidal sector of the zone, collected for the spring-summer agricultural cycle of 1976 and the winter cycle of 1976-77. The ejidal sector was chosen by the Centro de Investigaciones Agrarias (CDIA) because it was more representative of the employment situation of "poor" Mexican agriculture than the private farms.

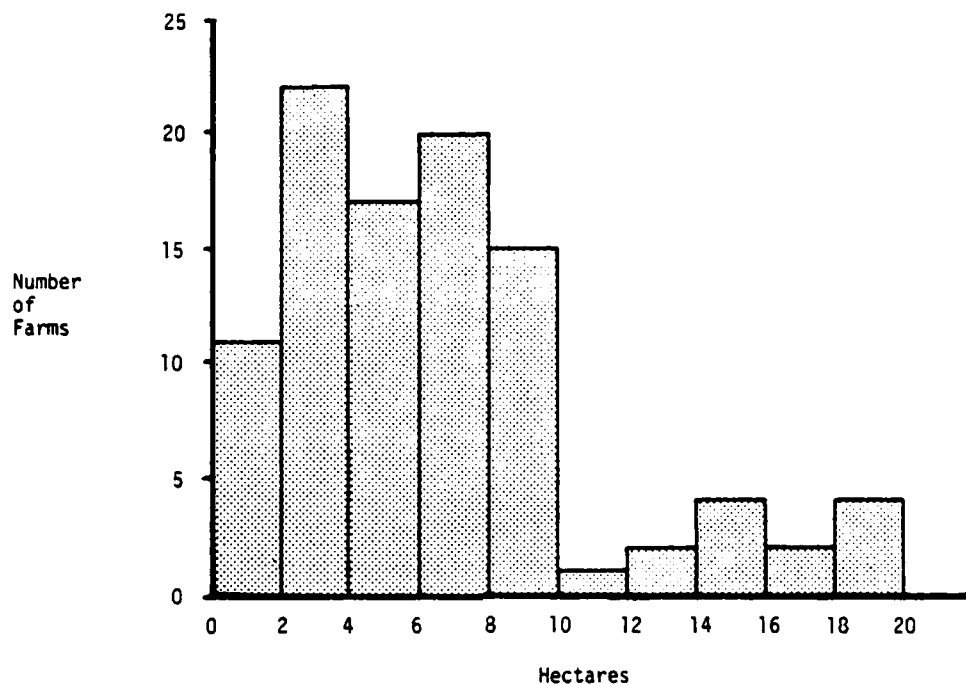
From this sample were chosen 98 production units randomly within three farm size categories. Like most ejidal farming in Mexico, each plot is cultivated individually, and as long as it is cultivated regularly, it can be passed down from father to children though not sold nor legally divided into smaller plots. This reduced sample of 98 farms and the corresponding households forms the basis of our analysis, although it will be occasionally supplemented by data from the CDIA study of the larger sample.

2.1 Basic Characteristics

The average farm size for the sample was 7.1 hectares, and Figure 3-1 demonstrates that most ejidal farms in the sample are between 2 and 10 hectares.

The low level of agricultural technology employed by these farms is indicated by the value of agricultural capital; only 32 of the 98 ejidarios employed any capital inputs other than basic implements, and the average value for these 32 cases was only \$3,526

FIGURE 3-1
Farm Size Distribution: Las Huastecas



pesos, or less than \$300 dollars at the exchange rate prevailing during the period. Twenty-three farms in the sample possessed draft animals, with an average value of \$4513 pesos per farm. Summing these to obtain the total value of agricultural capital for the production unit and dividing by the corresponding farm's size gives the amount of capital employed per hectare, which averaged only \$285 pesos, or less than \$25 dollars. Purchased inputs used in crop cultivation are also low,--\$295 pesos/ha. for corn, \$416 pesos/ha. for sugar cane, and \$248 pesos/ha. for coffee--composed primarily of hired labor, machinery, and draft animals.

If a composite farm were to be created from the data, the 7.1 hectares on the average farm would have almost 3 hectares uncultivated, some of which would be in pasture, 2.4 hectares in corn, 0.8 hectares in sugar cane, and 1 hectare divided equally among coffee and all other crops, such as oranges and tomatoes. The dominance of subsistence crops is indicated by an average of .66 for the ratio of land in subsistence crops, defined in this case as corn and "others", to total cultivated land.

However, were the ratio of subsistence to total crops calculated on the basis of the value of production, it would fall to .44. This is due to the higher value per hectare of coffee and cane than that of corn. Cane produced \$9680 pesos/ha., coffee \$6609 pesos/ha., while corn produced only \$1849 pesos/ha. Nevertheless, 90 percent of the farmers grew corn, while only 50 percent grew sugar cane and 30 percent coffee. The lack of specialization in coffee and cane despite differences in their values relative to that of corn is due to two factors: the role of corn as the basic staple, and the nature of the inputs required for production of cane and coffee. As we shall see, cane is especially labor intensive, while coffee is a perennial crop requiring more particular soil conditions. For the composite farm, the value of production per hectare was \$3273 pesos.

The subsistence nature of corn production is supported by the data: only 36 percent of the corn produced was sold (the

average farm selling 14 percent of its production), while 94 percent of the sugar cane and 93 percent of the coffee was marketed. The average of marketed to total production for the composite farm was 44 percent.

2.2 Farm Income

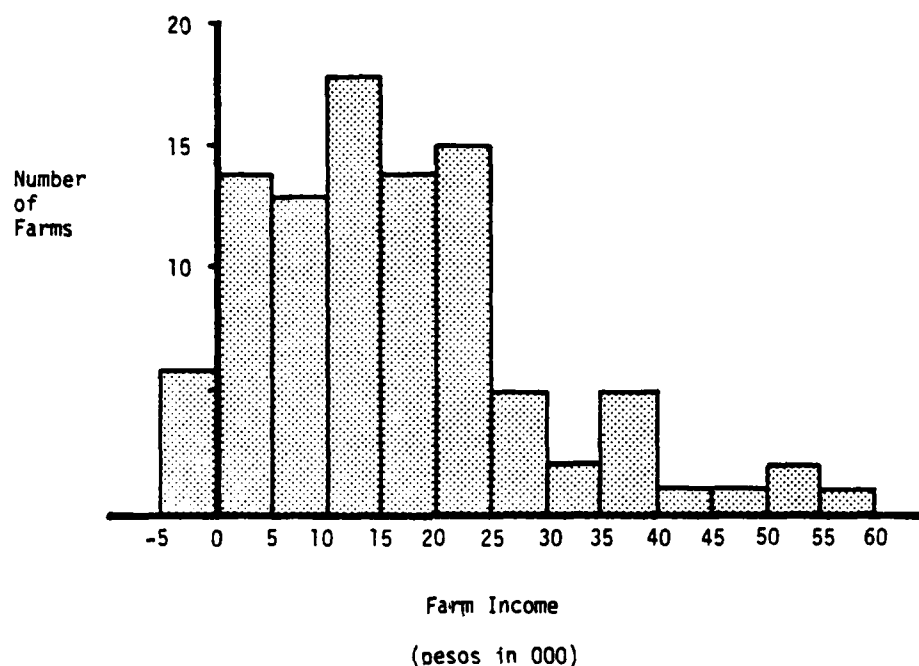
Farm income for the sample averaged \$16,816 pesos, composed of the sum of the values of crop production, livestock sales, and animal products, less wages and machinery rental. Figure 3-2 demonstrates that farm income was even more concentrated than farm size; 82 percent of the farms produced incomes less than \$25,000 pesos, or \$2,000 dollars.

Farm income is one of the critical variables influencing the allocation of household labor to on- and off-farm activities in the model presented in the previous chapter. The principal variables hypothesized to affect farm income are land size, agricultural capital, and the composition of crops, and these are also related to one another. A statistical method commonly known as "path analysis" allows separation of the direct and indirect influence of these factors (Blalock, 1972). Figure 3-3 presents the results of a path analysis of the variables affecting farm income in the model.

The coefficients on the arrows represent the direct influence of one variable upon the other. Thus land size is directly and positively related to farm income, and the weight of this

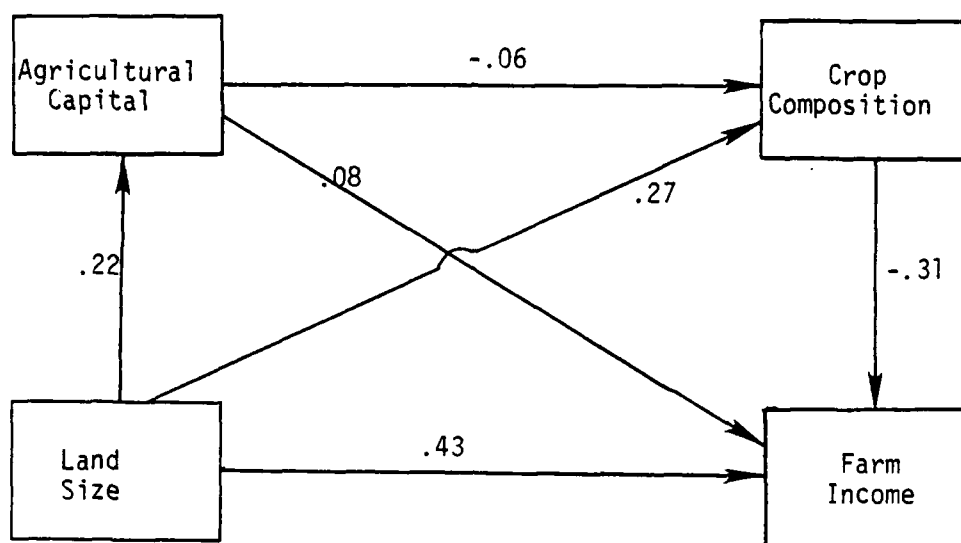
FIGURE 3-2

Farm Income Distribution: Las Huastecas



variable is approximately five times the direct effect of agricultural capital upon farm income. Land size also positively affects farm income indirectly through its effect upon agricultural capital, though the effect is small, and negatively affects income through its impact upon crop composition (defined as the ratio of land in subsistence crops to total crops). Thus it appears that when farms are larger, they tend to shift away from the more labor-intensive crops, coffee and cane. The direction of each of the

Figure 3-3
Path Analysis of Farm Income: Las Huastecas



relationships (excluding crop composition which must be specified for each regional crop mix) is consistent with that predicted in the general model, confirming the validity of this important segment of the model of labor allocation. Overall, the model explains about 25 percent of the variance in farm incomes in the sample, which is rather high considering the narrow range of incomes exhibited in Figure 3-2, the influence of local soil types, and the impreciseness of the data on purchased inputs and the value of production consumed on the farm.

The dominant influence of land size upon farm income is to be expected. If we take away the effect of farm size and examine the relationship between farm income per hectare, which

averaged \$3,174 pesos, and basic agricultural inputs, we find the following,

$$\begin{array}{lcl} \text{YFARMH} = & 2,472 & + 3.23 \text{ SUPTOT} + .404 \text{ KLRATIO} \\ \text{significance} & (.947) & (.302) \\ \text{elasticity} & (.001) & (.043) \end{array}$$

$$\begin{array}{lcl} & - 1,870 \text{ CRPCOMS} & + 22.7 \text{ TOTONLH} \\ & (.013) & (.001) \\ & (-.465) & (-.465) \end{array}$$

$$R^2 = .33 \quad F = 11.4 \text{ (significance} = .001\text{)}$$

where YFARMH is defined as farm income per hectare, SUPTOT is land size, KLRATIO is the value of capital per hectare, CRPCOMS is the percentage of land in subsistence crops, and TOTONLH is total labor per hectare. The only variables significantly related to farm income per hectare are crop composition and farm labor per hectare, which follows from the previous analysis of the higher value and labor requirements of the commercial crops. The lack of a relationship between farm size and income per hectare demonstrates that there are no economies of scale in the zone, and it appears that agricultural capital is not important to per hectare returns. Thus, in contrast to other regions in which certain necessary inputs are only available to the larger farmers, households with smaller plots of land are at no relative disadvantage. When land size increases, the path analysis indicates that a larger percentage of it is put

into the least remunerative crop, tending to level farm income over a range of farm sizes. This explains the concentration of farm income relative to farm size, exhibited in Figures 3-1 and 3-2.

2.3 Farm Labor

The average household in the sample, composed of 3.3 members 16 years of age or greater, worked 275 days on their farm, two-thirds of their total on- and off-farm labor. In addition to this, about two-thirds of the farms also hired labor, adding 52 days of labor, to bring the total labor input on the average farm to 327 days.

If farm income is divided by household labor inputs, the implicit wage per day worked on-farm averages \$61.3 pesos. This probably overstates the actual implicit wage, for it primarily captures direct crop labor inputs, neglecting daily chores which the agricultural operation entails. These activities are often performed by women, children, and older persons of the household.

Labor requirements vary greatly among crops, not only with respect to their absolute requirements, but also their relative use of labor by the farmer, his family, and hired workers. Table 3-2 shows the amount of labor used for various crops by these categories.

Several observations may be made concerning total labor inputs per crop. Sugar cane is by far the most labor-intensive

TABLE 3-2

Total Farm Labor Inputs by Crop and Category
of Worker: Las Huastecas (days)

<u>Category of Worker</u>	<u>Corn(%)</u>	<u>Sugar Cane(%)</u>	<u>Coffee(%)</u>	<u>Others(%)</u>
(Number of farms)	(88)	(52)	(36)	(46)
Farmer	53 (43)	92 (42)	47 (51)	16 (48)
Family members	52 (42)	108 (49)	30 (32)	9 (27)
Hired labor	19 (15)	21 (9)	16 (17)	8 (24)
Total labor	124 (100)	223 (100)	93 (100)	33 (100)

crop, though this extra labor comes almost entirely from the farm household. The farmer puts in nearly twice the labor on cane as on any other crop, indicating a more even distribution of labor requirements throughout the year, probably because cane requires several cuttings and weeding. Unfortunately, we do not have direct data about the seasonal labor distribution of major crops in Las Huastecas with which to test this hypothesis.

The proportion of labor inputs by the farmer to that of his family is strikingly equal among crops, underscoring the importance of the total household as a labor unit. Hired labor is used in every crop, and although it never amounts to more than a fourth of total labor inputs, its use even in subsistence crops indicates that it forms a critical supplement to family labor. For all crops, hired labor averaged 16 percent of total labor inputs.

Labor inputs per hectare vary even more than absolute requirements among major crops in the zone. Table 3-3 shows per

hectare labor use in cane is three times greater than that in corn. Even at these differences among labor inputs, the higher commercial values of sugar cane and coffee more than compensate for the increased amount of family labor; the net-income produced per day of family labor averages \$83 pesos for cane, \$99 pesos for coffee, and only \$30 pesos for corn. This last figure closely corresponds to the local wage for jornalero labor (the average wage paid to hired labor in corn production was \$32 pesos), indicating the relatively low remuneration of subsistence production. This correspondence could be accidental, or it could be that the household implicitly calculates the value of additional labor inputs relative to that which could be earned in a similar waged occupation. Labor inputs per hectare for all crops averaged 75 days; 63 days for the farmer and his family and 12 days for hired labor.

TABLE 3-3

Farm Labor Inputs per Hectare
by Crop: Las Huastecas (days)

	<u>Corn</u>	<u>Sugar Cane</u>	<u>Coffee</u>	<u>Others</u>
Total Household Labor	38	135	56	21
Hired Labor	<u>7</u>	<u>14</u>	<u>12</u>	<u>7</u>
Total Labor	45	149	68	28

The model of labor allocation presented in Chapter II relates farm labor to land size, agricultural capital, techniques of production, and crop composition. All of these variables were found to be significantly correlated with total on-farm labor in Las Huastecas. Given the over-riding influence of land size and its high degree of correlation with the other independent variables, a more accurate picture of the other factors affecting farm labor is obtained by using farm labor per hectare (TOTONLH) as the dependent variable in a multiple regression.

$$\text{TOTONLH} = 81.29 + .244 \text{ VALKAP} - 55.26 \text{ CRPCOMS} + .870 \text{ MAQCRP}$$

significance	(.001)	(.001)	(.037)
elasticity	(.127)	(-.661)	(.060)

$R^2 = .25$ $F = 10.59$ (significance = .001)

The value of agricultural capital (VALKAP) and the amount of machinery rented (MAQCRP) are each positively and significantly related to farm labor per hectare, indicating that in this zone capital does not substitute for labor but rather complements it, and the amount of land in subsistence crops (CRPCOMS) is negatively related to labor use. This latter result follows directly from the lower labor inputs of corn.

However, within the terms of the model of labor allocation, it is not total farm labor but that portion of it which is contributed by the household which is related to off-farm labor.

As was emphasized in the previous chapter, the decision of how much farm labor to hire is dependent upon and simultaneous with the allocation of household labor to off-farm activities. Thus the variables directly affecting the proportion of hired farm labor to total farm labor (HIRFAM) were hypothesized to be labor in off-farm activities (DHJOR), household size and composition (NUMMAY), crop composition (CRPCOMS), farm income (YFARM), and total on-farm labor (TOTONL). A multiple regression on these variables yields the following:

$$\begin{aligned} \text{HIRFAM} &= .13 + .44 \text{ YFARM} - .33 \text{ NUMMAY} + .25 \text{ CRPCOMS} \\ &\quad \text{significance } (.014) \quad (.055) \quad (.747) \\ &\quad \text{elasticity } (.493) \quad (-.734) \quad (.106) \\ &\quad + .26 \text{ DHJOR} + .49 \text{ TONL} \\ &\quad \quad (.079) \quad (.710) \\ &\quad \quad (.155) \quad (.107) \\ R^2 &= .11 \quad F = 2.32 \text{ (significance} = .050) \end{aligned}$$

Each of these variables exhibits the sign predicted in the model: a larger percentage of labor is hired as total farm labor increases, off-farm labor increases, farm income increases, and more land is devoted to corn, implying a more uneven seasonal distribution of labor inputs. The size of the household labor force negatively affects the percentage of hired labor. The variables most

significantly affecting the ratio are farm income, household labor force, and off-farm labor.

The model of labor allocation which was developed in the last chapter therefore correctly specifies the influence of the major variables affecting farm labor and its allocation between household members and hired labor. The next section will examine these and other factors which determine the allocation of household labor to off-farm activities.

3. OFF-FARM INCOME, LABOR, AND MIGRATION

3.1 Off-Farm Income and Labor

Of a total of 414 days worked during the year by the average household, 139 days, or about one-third, was worked off-farm. Eighty-nine of the 98 farms engaged in some type of labor activity other than production on their own land. Fewer of these, however, earned income from this work, for in this indigenous zone labor is still exchanged without wages and used for community service. Thus the average household earned only \$2,411 pesos off-farm, or about 20 percent of total income, while those 53 households with income from other sources earned 44 percent of their total income off-farm.

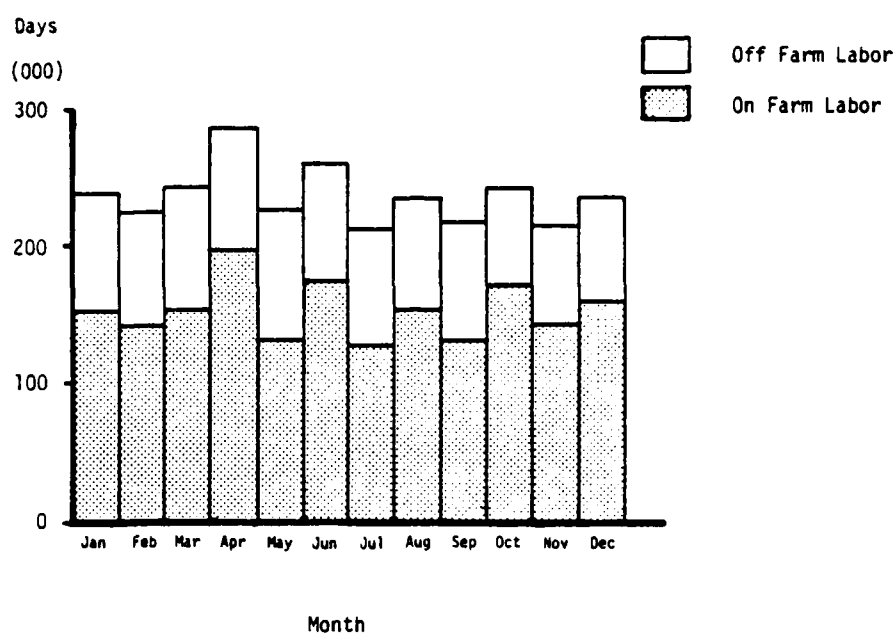
The only significant source of salaried off-farm employment for the households surveyed was agricultural day labor (jornalero labor). The CDIA study shows that 77 percent of the days worked in waged occupations were as a jornalero, and with the exception of domestic labor, no other single occupation was more

than one percent of the total. Wages earned from agricultural day labor were \$3,363 pesos for the average household in our sample, or 80 percent of total off-farm income. The local wage rate was around \$30 pesos per day and higher in more distant areas, so that this household devoted 90 days to jornalero labor to earn this income. They also contributed 40 days to non-waged pursuits, either in community labor or labor-sharing agreement.

Figure 3-4 shows the seasonality of total labor use in Las Huastecas. Off-farm labor shows a striking lack of seasonality, and on-farm labor is also well-distributed throughout the year. Off-farm labor does not appear to vary with the requirements of farm production except for the period of the corn harvest, October and November, when it drops off significantly. Thus, off-farm labor is not the residual of household labor supply minus farm labor inputs, but is rather an integral part of total household labor throughout the year.

This reasoning is confirmed by the CDIA study in the zone. Sixty percent of the laborers claimed they worked off-farm "to get more money" or because of "necessity", while only 20 percent said it was because there was no more work to be done on their land. However, in our sample, farm income on the average exceeded household expenditures; households reported average expenditures of \$14,581 pesos, which was \$2,235 pesos less than income from farm production. This average, of course, includes the relatively high

FIGURE 3-4
Seasonality of Labor Use: Las Huastecas



incomes of the larger farms, and so many households must have been dependent upon their off-farm sources of income.

It is difficult to assess the level of household employment or unemployment from these data, because there is no clear delineation of which household members are in the labor force. If the labor force were defined as all family members 16 years of age or more, total employment would be about 125 days per person. This clearly understates the true number, for included in this definition are women, who contribute less measured labor than do men. A more accurate picture of the employment situation of a single

individual is given by CDIA data on labor by the principal cultivator: he worked 151 days on the farm, 50 days off-farm in a waged occupation and 34 days in non-salaried activities (these activities were the principal responsibility of the household head, and so represent a greater proportion of his off-farm labor than of total off-farm household labor). Of a regional working year comprised of 300 days, these activities sum to 235 days, indicating a rate of unemployment of 22 percent for the farmer. This rate is probably exceeded by other household members who lack the responsibility for unpaid community labor.

The analysis of the off-farm labor relationships hypothesized in the labor allocation model is simplified by the regional occupational concentration. The variables affecting the allocation of family labor to on- and off-farm activities can be grouped in two sets, the necessary level of off-farm income, and household farm labor relative to household size. The income variable is represented by farm income per person (YFRMP), and the set of farm labor variables by crop composition (CRPCOMS), the amount of hired labor per hectare (HIRLABH), and the size of the household relative to farm size (NUMSUP). A multiple regression of off-farm labor (PEROFFLF) on these variables is shown below. Each of the variables exhibits the predicted sign, and the overall relationship is significant as evidenced by the F-statistic. The two variables explaining most of the variance are farm income per person and family size per hectare.

$$\text{PEROFFLF} = -3.80 + .780 \text{ YFRMP} + .675 \text{ CRPCOMS}$$

significance (.001) (.677)

elasticity (1.43) (.236)

$$- .634 \text{ HIRLABH} + 3.72 \text{ NUMSUP}$$

(.787) (.001)

(-.031) (1.38)

$R^2 = .40$ $F = 15.66$ (significance = .001)

3.2 The Location of Off-Farm Labor

Agricultural day labor by households in our sample was almost exclusively employed within the region: 63 percent of the days worked were within the same municipio, 36 percent were in a different municipio but within the region, and only one percent were outside the region. None of the households in our sample worked in the United States during the year of study, despite their relative proximity to the border.

TABLE 3-4

Jornalero Labor, Income, and Salary by Location: Las Huastecas

<u>Location</u>	<u>Number of Households</u>	<u>Days Worked</u>	<u>Income (pesos)</u>	<u>Wage/Day (pesos)</u>
Same municipio	33	167	\$5,371	\$ 31
Within region	12	271	12,589	64
Outside region	2	28	737	33

Table 3-4 indicates the relative remuneration of jornalero labor within and outside of the municipio. The latter is paid significantly better, and more time is devoted to jornalero labor by households which work in other municipios. This undoubtedly reflects the less-casual nature of this labor; it involves commuting and possibly periods of days spent without returning home, so that this fixed cost must be overcome by more extended stays and higher wages.

In addition to this local salaried labor, 18 households in the sample have members who were occupied in another area at the time of the interview. The CDIA study shows 77 percent of household members who were absent sent money home, averaging \$2,135 pesos per migrant during the year. These remittances would form a significant portion of total household income for those households with migrants.

Thus, migration, whether permanent or circulatory, does not play a major role in the labor activities of the zone. The great majority of off-farm labor was as a jornalero within the same municipio, and was supplementary to on-farm labor. Despite low incomes and standards of living, and relative proximity to major centers of employment at higher wages (Mexico City, Monterrey, and the United States), this option was rarely used by households in the zone.

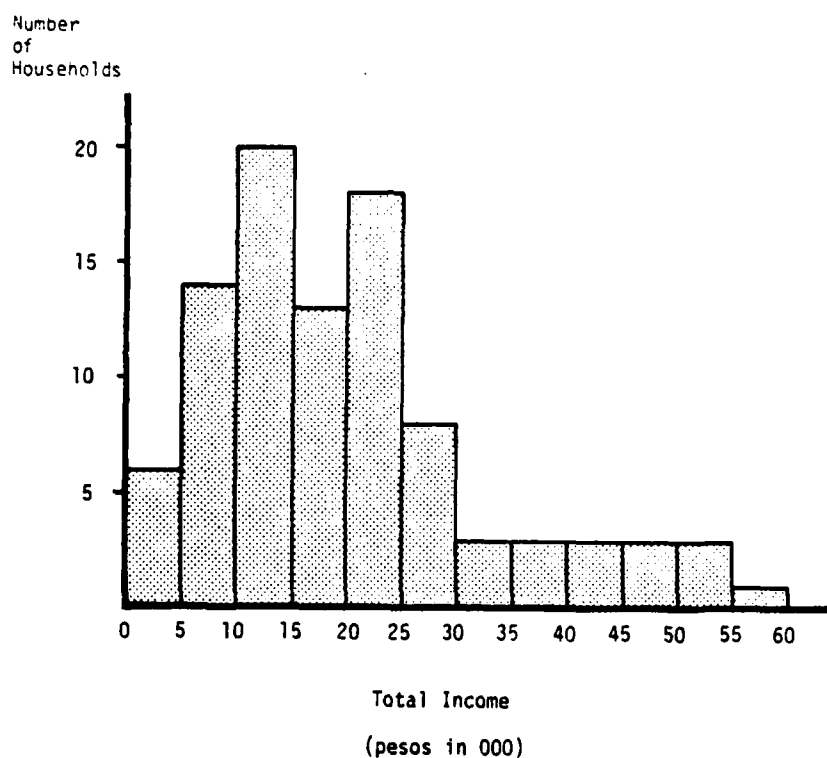
4. CONCLUSIONS

Las Huastecas embodies many of the stylized characteristics of traditional agriculture: farm sizes and their corresponding incomes are small, yet this is the major source of household income; only a minimal amount of agricultural capital is used, but this is compensated for by adequate rainfall permitting year-round is predominantly local agricultural labor and unpaid duties corresponding to the regional culture of the dominant Indian population.

While for the average household farm income exceeds household expenditures, Figure 3-2 demonstrated that farm income is sharply skewed, and that most farms in the zone have incomes less than \$20,000 pesos. For these households with low farm income, off-farm labor is a necessary part of their survival strategy. If the total sample is divided into those households with positive off-farm income (53 households) and those dependent upon the sale of farm production for their cash needs, some interesting differences emerge. The former farms are smaller (6.2 versus 8.4 hectares), and generate an average of \$12,617 pesos of income compared to \$21,762 pesos for the farms dependent upon this source alone. Family on-farm labor is also less for those farms who work off-farm--239 days compared to 316 days. All of these differences are significant at the .01 level or better, indicated by a t-test of their pooled variance. The result of this additional income is that total income, the sum of farm income and off-farm income,

differs by only \$1,359 pesos between the groups, which is not statistically significant. The distribution of total income for households in Las Huastecas is shown in Figure 3-5.

FIGURE 3-5
Total Household Income: Las Huastecas



Thus off-farm income is a significant portion of total income for about half of the farms in our sample, while the rest of the households do not find it necessary to work for wages. What is striking in Las Huastecas is that almost all of this off-

farm income is generated locally through jornalero labor. Most farmers in the zone use hired labor, and climatological conditions distribute labor requirements evenly enough over the year to provide employment in some local crop when there is no work on the farm. The agricultural sector of the region, though bearing all the characteristics of a predominantly peasant mode of production, provides adequate income and employment to meet the minimal needs of the indigenous population.

But in addition to describing the salient characteristics of Las Huastecas as a prelude to comparison with other zones, the relationships developed in the previous chapter have been applied to explain differences in the allocation of labor among households. Because there was no significant source of off-farm employment other than jornalero labor, the principal variable to be explained was the allocation of household labor to on- and off-farm activities. As hypothesized in the model, this variable was significantly related to farm income, household size relative to land size, and the amount of hired labor. Households with less farm income and more working members applied more days to jornalero labor, and hired fewer workers to help them in their agricultural activities. Farm income varied positively with farm size and agricultural capital, and negatively with the amount of land cultivated in subsistence crops. This model, emphasizing the simultaneity of household labor allocation decisions concerning family farm labor, hired farm labor, and off-farm labor, and specifying the major variables

affecting this allocation, thus adequately represents the labor allocation process in Las Huastecas.

After a parallel discussion of labor allocation in three other zones of Mexico, the second stage of the research will abstract from these factors at the household level by comparing patterns of labor allocation among regions. It will therefore capture the influence of variables at the regional level, both directly and through their influence upon these major farm and household variables.

CHAPTER IV

VALSEQUILLO, PUEBLA

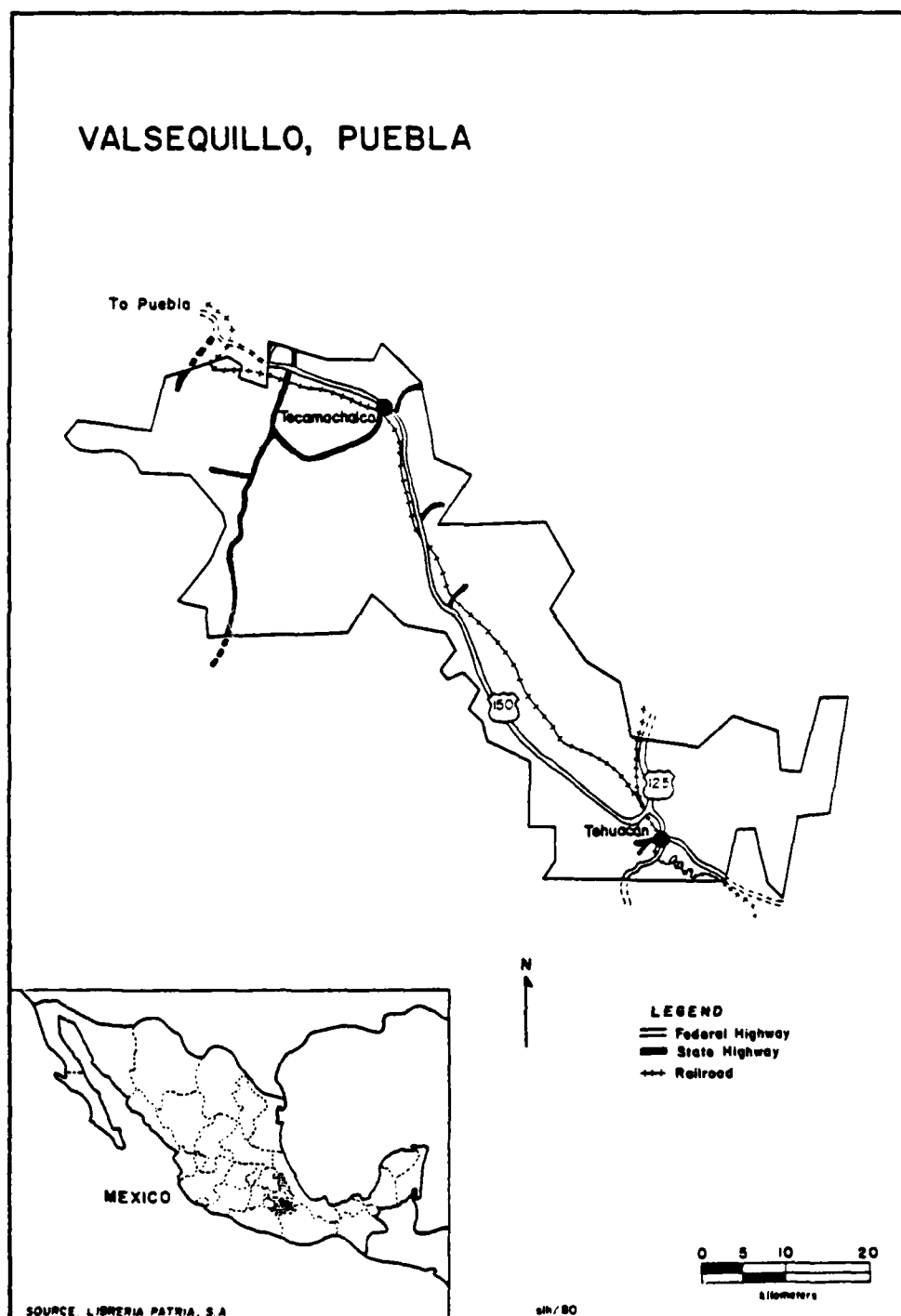
The zone of Valsequillo is located in the southern extreme of the state of Puebla in central Mexico. The zone is defined by 16 municipios which comprise Irrigation District No. 30, one of the small-scale irrigation districts administered by the Secretaría de Recursos Hidráulicos. In many parts of Mexico irrigation is essential to agricultural production, and a large part of Mexican agricultural production is produced on irrigated land; the 21.7 percent of the land cultivated with irrigation in 1973 produced 42.9 percent of the total value of production. However, large irrigation zones such as those in Sinaloa and Sonora dominate this production, and Valsequillo is more representative of Mexico's subsistence agriculture than of these highly productive irrigation districts. It should, therefore, prove interesting to compare the effects of irrigation on patterns of labor allocation in Valsequillo.

1. CHARACTERISTICS OF THE REGION

1.1 Physical Factors

The irrigation district of Valsequillo is located in the valleys of Tecamachalco, Tehuacán, and Tlacotepec. It is a generally arid part of the state of Puebla, with an average annual

Valsequillo, Puebla



rainfall of 500-700 mm. (20-28 inches), and the sixteen municipios which comprise the district and the survey area also include within their borders unirrigated and barren hillsides which are typical of this region of the state.

The irrigation district covers 34,340 hectares, but of these only 16,000 to 27,000 hectares receive water during the year. Irrigation water is provided through a system of canals emanating from a reservoir created by the Avila Camacho dam, but this supply is sufficient for widespread use only during the spring-summer agricultural cycle. Most farmers, therefore, grow corn, supplementing seasonal rainfall with irrigation. With the exception of alfalfa, few crops are grown which require water during the winter cycle. Major crops and their yields are shown in Table 4-1.

TABLE 4-1
Major Crops and Yields: Valsequillo

	Area Cultivated (hectares)	Percent Total Area	Yield (kgs./ha.)
Corn (unirrigated)	2,434	6.9	420
Corn (irrigated)	20,049	57.1	3,155
Beans (irrigated)	5,195	14.8	933
Alfalfa	3,970	11.3	56,686
Tomatoes	564	1.6	12,888
Oats	933	2.7	732
Others	1,960	5.6	--
Total	35,105	100.0	

Source: Barbosa-Ramírez, 1977.

Table 4-1 demonstrates two important facets with respect to irrigation in the zone: (1) most of the cultivated land is in crops which do not normally require irrigation, because water is available only during that part of the year which also receives the seasonal rains; and (2) irrigation is essential for good yields of these crops, the corn yield on irrigated land being 7.5 times greater than on unirrigated land.

1.2 Demographic and Cultural Factors

The sixteen municipios which comprise the district of Valsequillo had in 1970 192,429 inhabitants, indicating an average population density of 560 persons per square kilometer. Despite the location of the relatively large town of Tehuacán, most of the population lives in rural villages of less than 3,000 inhabitants. Thus the zone is typical of densely populated regions in the Central Plateau.

The zone is typical of the Central Plateau in aspects other than the prevalence of subsistence production and a relatively dense but disperse population. It is a predominantly mestizo zone, in which early domination by the Spanish has erased important attributes of Indian culture such as language and viable social institutions. It thus differs greatly from Las Huastecas or the Mixteca Baja of Oaxaca, and is similar to the Bajío, although its Indian heritage is more pronounced than in that frontier zone, which was sparsely populated at the time of the Conquest.

Living standards are poor, but better than those in the two indigenous zones. One half of the homes in the southeast part of the state of Puebla, an area of 38 municipios encompassing the 16 in the Valsequillo district, consisted of one room (Gobierno del Estado de Puebla, 1975). Sixty-nine percent of these, however, had electricity, while 52 percent of the population could obtain potable water locally. The principal staples of the local diet continue to be corn and beans, although supplemented by animal products through a more widespread ownership of cows, resulting from the availability of alfalfa.

The region encompasses both ejidal and private farming, although it will be evident that there are few differences between the majority of farm units when classified by this criterion. The CDIA selected a total sample of 299 households, 220 private and 79 ejidal. From this sample 99 interviews within three farm size categories were chosen at random according to the relative incidence of farm units in each size category in the district. Data derived from this subsample will be the basis for the analysis in this chapter, except when specifically noted otherwise.

The average household in the sample consisted of 5.85 individuals living at home at the time of the interview, 3.65 of which were 16 years old or more. These older members averaged 2.3 years of education apiece. Thus, like other zones in the study, the average level of education is low.

1.3 Economic Factors

The predominance of the primary sector in labor force composition is indicated by its occupying 55.7 percent of the labor force of 48,908 persons. Even this statistic understates the overall importance of agriculture, for it includes the population of Tehuacán, an important commercial center. Table 4-2 (in addition to identifying the municipios in the study area) shows that the primary sector, almost entirely agricultural, employs over two-thirds of the labor force in 11 of the 16 municipios.

The agricultural sector of the zone is predominantly small-scale, traditional and subsistence. Small-scale because of all the farm units censused in the zone, 93 percent were less than 5 hectares; traditional because only 54 percent of the cropland is fertilized, resulting in low yields; and subsistence because of the dominance of corn and beans, with the average farm selling only 37 percent of their production of these crops. Most farm households can therefore be properly classified within the peasant mode of production.

The significance of the capitalist mode of production to the zone as a whole is understated in these statistics, however. Although the majority of private and ejidal farms were very small, out of our sample of 99 farms only 7 farms of over 20 hectares each controlled 37 percent of the total land and 56 percent of the value of agricultural machinery and implements. The Secretaría de Recursos

TABLE 4-2
Economically Active Population: Valsequillo

<u>Municipio</u>	<u>Total</u>	<u>Primary Sector</u>	<u>(%)</u>	<u>Other Sectors</u>	<u>(%)</u>
Acajete	6,227	3,935	(63.2)	2,292	(36.8)
Atoyatempan	688	441	(64.1)	247	(35.9)
S.T. Hueyotlipan	924	679	(73.5)	245	(26.5)
Huitziltepec	781	595	(76.2)	186	(23.8)
Molcaxac	1,354	1,080	(79.8)	274	(20.2)
S.S. Huixcolotla	1,048	819	(78.1)	229	(21.9)
Santiago Miahuatlán	1,441	884	(61.3)	557	(38.7)
Tecali de Herrera	2,032	1,247	(61.4)	785	(38.6)
Tepeyhualco Cua.	233	190	(81.5)	43	(18.5)
Tochtepec	1,836	1,473	(80.2)	363	(19.8)
Tecamachalco	5,215	3,485	(66.8)	1,730	(33.2)
Tehuacán	17,899	4,980	(27.8)	12,919	(72.2)
Tepanco de López	1,906	1,632	(85.6)	274	(14.4)
Tlacotepec, B.J.	4,590	3,690	(80.4)	900	(19.6)
Yehualtepec	2,032	1,603	(78.9)	429	(21.1)
Xochitlán	<u>702</u>	<u>510</u>	<u>(72.6)</u>	<u>192</u>	<u>(27.4)</u>
Total	48,908	27,243	(55.7)	21,655	(44.3)

Source: Barbosa-Ramírez, 1977, based on data from the IX Censo de Población, Puebla, 1970.

Hidráulicos counted 188 tractors in the zone in 1975, 158 of which were located on private farms. Given that 70 percent of the farmers in our sample used some machinery in cultivation (generally in the initial plowing of the land for planting), many of the farmers with tractors must engage in machinery rental, forming an important link

between the two modes of production. These large farms are, of course, dependent upon labor from the peasant mode.

The subsistence nature of agricultural production in Valsequillo should not, however, be taken to indicate that the zone is isolated from the economic and cultural mainstream of Mexico. On the contrary, the zone has long played an important role in the history of Mexico, located along the old route from Mexico City to Veracruz, the major Gulf port. It is 73 miles from Puebla and 150 miles from Mexico City via major highways, and in the larger zone of 38 municipios studied by the Puebla state government there were 433 miles of maintained roads.

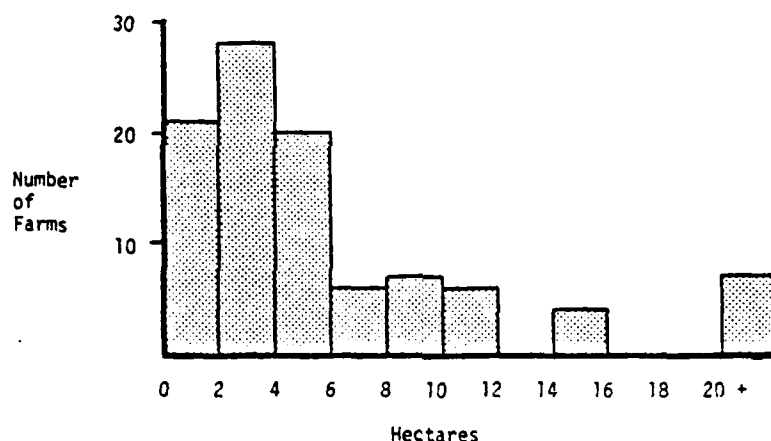
The town of Tehuacán is itself a major influence on the region. It has five banks, eleven hotels, five public baths utilizing the famous spring water and attracting tourists to the beautiful haciendas which once dominated the region, and a diversified economy based on bottling, minerals, agricultural processing, egg production, tourism and crafts. The state government study concluded that the town of 80,249 persons is "one of the best-endowed growth poles in terms of infrastructure" in the state (Gobierno del Estado de Puebla, 1975:138). Thus Tehuacán and other small towns in the district provide important links to the national economy, and a source of off-farm employment for rural dwellers which is not limited to agricultural pursuits.

2. FARM INCOME AND LABOR USE

2.1 Basic Characteristics

The average farm in the sample of 99 farm units in Valsequillo was 6.1 hectares, 4.7 of which were irrigated. However, as Figure 4-1 demonstrates, the distribution of farm size is heavily skewed, and 70 percent of the farms were less than 6 hectares.

FIGURE 4-1
Farm Size Distribution: Valsequillo



The ownership of agricultural capital in the form of machinery, implements, and animals is more widespread in Valsequillo than in the two indigenous zones. Seventy-seven of the 99 farms possessed agricultural equipment, valued at \$11,816 pesos per farm,

while 64 farms had animals, valued at \$4,832 pesos. The total value of agricultural capital for all farms in the sample was \$1,798 pesos per hectare, considerably higher than the \$285 pesos per hectare for Las Huastecas. In addition to the use of capital inputs owned by the household, the average farm rented machinery worth \$938 pesos, bringing the total value of purchased inputs such as seed, fertilizer, and water (purchased from the District at nominal rates) to \$479 pesos per hectare.

Overall, Valsequillo exhibits a level of agricultural technology which is characteristic of the peasant mode of production, although purchased inputs are 68 percent higher than in Las Huastecas and a significant number of farmers use machinery in their agricultural operations. Valsequillo thus has the basic infrastructure necessary for agricultural development: irrigation, availability of machinery and purchased inputs, and access to markets and a diversified local economy through a good system of roads. But these advantages have not been sufficient to eliminate the peasant mode of production, nor the extensive cropping pattern on larger capitalist farms.

The dominance of subsistence crops is shown by the composition of crops on the composite farm: the 6.1 hectares would have 5.3 hectares in cultivation in at least one agricultural cycle, a relatively high ratio for Mexico resulting from the availability of water and the predominance of arable valley land. Of

these, however, 4.9 hectares would be in the major subsistence crops, corn and beans. In fact, 87 of the 99 households cultivated corn, and the average farm had a crop composition of .87, defined as the ratio of land in corn and beans to all crops. Only 37 percent of the corn grown on these farms was sold, indicating the subsistence nature of this crop for the household. However, because the large farms contributed a heavy share of total production, 72 percent of all corn grown in the region was sold. Thus, while households in the peasant mode are numerically superior, they contribute only a small percentage of the marketed production of the region.

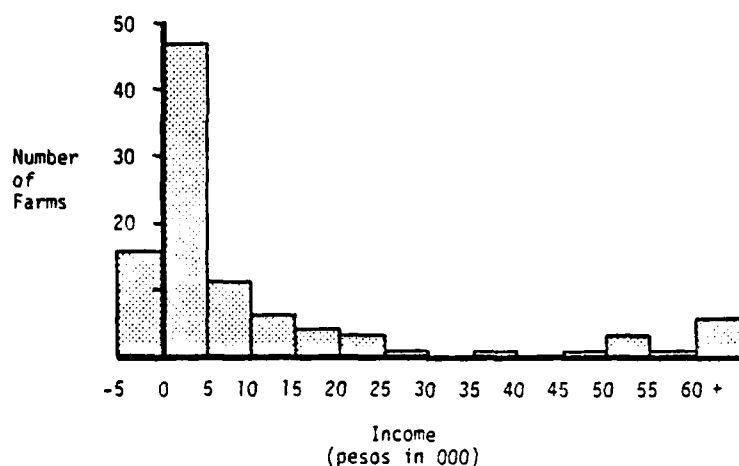
Corn is the major crop even on the large farms, although they have the resources to enable them to grow the most remunerative crops which the region will support. This is because the value of production among the alternatives varies little. Corn had an average return of \$2,332 pesos per hectare (85 farms), while beans produced \$2,025 pesos (37 farms), tomatoes \$2,016 pesos (4 farms), and "others" \$2,724 pesos (5 farms). Only alfalfa, producing \$5,648 pesos per hectare (19 farms) showed an appreciable difference, but this crop requires ample water and intensive labor on a regular basis. Thus the total value of crop production per hectare in the zone closely paralleled these values at \$2,218 pesos per hectare. To produce these crops the composite farm spent \$1,185 pesos per hectare in labor, fertilizer, machinery and other inputs, also approximately equal among crops.

2.2 Farm Income

Net income on the average farm was \$21,487 pesos, composed of net value of crop production and the value of sales of animals and animal products, which averaged \$11,402 pesos per farm. However, as we have had reason to observe, this average is heavily weighted by the relatively high incomes of the larger farms. Figure 4-2 shows that well over half of the farms in the sample produced a total income of less than \$5,000 pesos, and a significant number of these reported negative farm incomes. This is especially suggestive because only monetary expenses have been calculated, which do not include the value of household labor, implicit land rental, or depreciation. Thus, even if these implicit expenses to the farm household are not considered, farm income is only marginal for the majority of farms in Valsequillo, and most of it consumed on-farm. It does not provide a major source of cash income to meet the household's monetary requirements.

Applying a path analysis to the relationships on farm income developed in Chapter II results in the coefficients shown in Figure 4.3. The complete dominance of the direct effect of land size on farm income is clear in the diagram, and confirms the previous analysis of similar techniques and crops prevailing among farms of different sizes. As farm size increases, agricultural capital increases, but capital has an insignificant effect upon farm income. In the zone of Valsequillo, farmers with more resources do not have more remunerative crops to shift to and

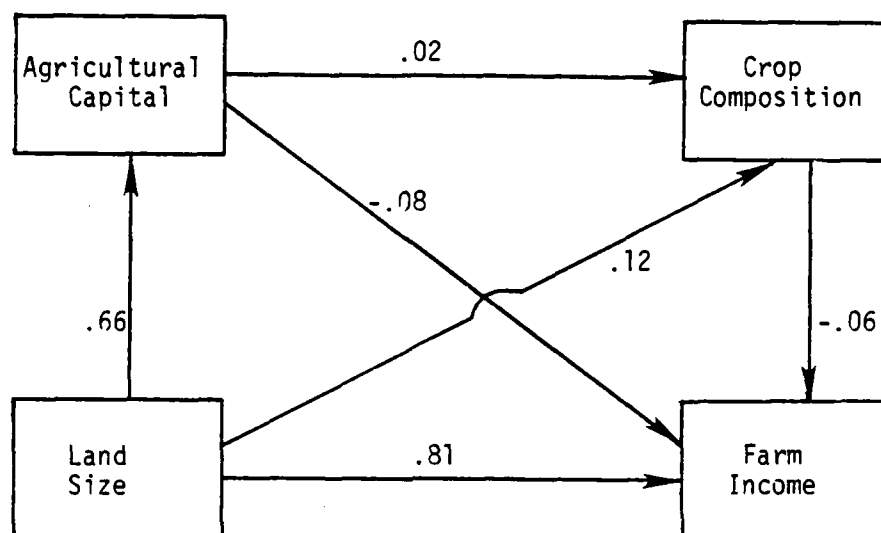
FIGURE 4-2
Farm Income Distribution: Valsequillo



thereby increase their income. The amount of land in subsistence crops does negatively affect income, but like in Las Huastecas, as farms are bigger they put more land in corn production. The diagram simply confirms what is obvious in an essentially monocultural region with no significant differences in agricultural techniques--the more land, the more output and the more income. Overall, the model explains about 58 percent of the total variance in farm incomes in our sample.

If abstraction is made from the dominant influence of farm size upon income, the influence of different types of agricultural capital and economies of scale may be determined more

Figure 4-3
Path Analysis of Farm Income: Valsequillo



precisely. Singling out corn production because of the more accurate specification of inputs, the value of production per hectare (VHMAIZ) is positively related to the percentage of the crop irrigated (PCTRMAIZ), agricultural capital per hectare in the form of both purchased inputs (GASHMAIZ), machinery rented (MAQHMAIZ), and the number of hectares in corn (SUPMAIZ), and negatively related to the amount of labor used (DTHMAIZ).

Although the overall relationship is significant as indicated by its F-value, only the percent of the crop irrigated and purchased inputs (primarily fertilizer) were in themselves significant.

$$VHMAIZ = 588.6 + 20.96 \text{ SUPMAIZ} + 1,871 \text{ PCTRMAIZ} - 5.58 \text{ DTHMAIZ}$$

significance (.773) (.001) (.515)

elasticity (.032) (.642) (-.086)

$$+ 1.77 \text{ GASHMAIZ} + .174 \text{ MAQHMAIZ}$$

(.005) (.758)

(.118) (.028)

$R^2 = .40$ $F = 9.50$ (significance = .001)

Labor is apparently used beyond the point where it adds positive contributions to the net value of production, and economies of scale are insignificant. Average farm income per hectare was \$2,257 pesos, less than the \$3,174 pesos calculated for Las Huastecas. Thus, despite a much closer intergration into the national economy, irrigation, and larger quantities of capital, farm income per hectare is significantly less because high-value crops cannot be grown and more purchased inputs are used. At this level of the analysis, the benefits of the higher level of capitalization and integration appear to be negligible for most households in Valsequillo.

2.3 Farm Labor

Total labor inputs for the composite farm were 165 days, with family labor averaging 78 days and hired labor 87 days. Because this composite includes some large farms, it overstates the relative importance of hired to family labor on the majority of farms.*

*Footnote on next page.

But hired labor is very important to agricultural production on most farms in the zone; 83 percent use wage labor, and for those farms, the average of hired to total farm labor was 53 percent.

Labor requirements do not differ greatly among crops. Table 4-3 shows the labor inputs per crop for farms growing that crop. Labor in tomatoes, usually a labor-intensive crop, is understated, because the small sample included one farm which did not harvest the crop. An average of 128 days were needed in corn production, almost identical to the labor inputs in corn in Las Huastecas. However, in that zone, only 15 percent of total corn labor was hired, while in Valsequillo this figure rose to 55 percent. Per hectare labor inputs for all crops averaged 37 days, 22 days for the household and 15 days of hired labor. This total is less than one-half of that in Las Huastecas.

In Las Huastecas, we found that the net value of corn production per day of family labor--the implicit wage--was equal to the prevailing wage for agricultural wage labor. In Valsequillo,

*The number of these larger farms, and the difference between them and farms in the peasant mode with regard to crop composition and per-hectare inputs, is not significant enough to merit a separate comparison of farm labor data. The zone is not as stratified as that of the Bajío, where average across farm size would lead to gross distortions, nor is it as homogeneous as Las Huastecas or the Mixteca Baja. This bias in aggregate data could be overcome by presenting it on a per hectare basis, but the critical link between the farm and the household would be severed by this method, and comparisons of farm labor to off-farm labor would be impossible. Therefore, the reader should bear in mind the obvious direction of the bias introduced by including larger farms.

this same calculation (which is subject to a wide variance among farms and therefore should be viewed cautiously) results in a much higher value, \$103 pesos per day worked. This is due to two factors: the higher value per hectare of corn production in Valsequillo, and the lower level of family labor inputs. The next section will show there to be a much wider variety of options for wage labor in Valsequillo than in Las Huastecas, which suggests that farmers in the zone substitute hired for family labor to enable them to work more off-farm.

TABLE 4-3
Farm Labor Inputs by Crop and Category
of Worker: Valsequillo
(days)

	<u>Corn</u>	<u>(%)</u>	<u>Beans</u>	<u>(%)</u>	<u>Tomatoes</u>	<u>(%)</u>
(Number of farms)	(87)		(40)		(4)	
Farmer	35	(27)	25	(30)	25	(30)
Family Labor	23	(18)	22	(26)	7	(9)
Hired Labor	<u>70</u>	<u>(55)</u>	<u>37</u>	<u>(44)</u>	<u>50</u>	<u>(61)</u>
Total Labor	128	(100)	84	(100)	82	(100)

It is not surprising, given the previous analysis, that total on-farm labor is primarily explained by land size. A multiple regression of on-farm labor (TOTONL) shows only land size (SUPTOT) and the percent of corn irrigated (PCTRMAIZ) are significant, while the value of capital (VALKAP and VALMAQ), purchased inputs (PITOT),

and crop composition (CRPCOMS) were all insignificant. Again, this emphasizes that neither technology nor crop composition vary enough in Valsequillo to have an important influence upon farm labor use.

$$\text{TOTONL} = 58.06 + 23.66 \text{ SUPTOT} - 84.01 \text{ CRPCOMS} + 91.40 \text{ PCTRMAIZ}$$

significance (.001) (.220) (.054)

elasticity (.863) (-.443) (.372)

$$- .21 \text{ VALMAQ} - .73 \text{ PITOT} - .67 \text{ VALKAP}$$

(.952) (.456) (.855)

(-.012) (-.082) (-.050)

$$R^2 = .54 \quad F = 18.11 \text{ (significance} = .001)$$

Hired labor has been shown to be important to the majority of farms in Valsequillo, including the very smallest. The ratio of hired farm labor to total farm labor plays a key role in the process of household labor allocation, for the household may increase hired farm labor to enable members to work more off-farm. Thus the household is hypothesized to have a greater proportion of hired farm labor as off-farm labor increases, number of working members per hectare decreases, and farm income increases. A multiple regression of this relationship (HIRFAM) shows only family size per hectare (NUMSUP) significant, while off-farm labor (TOTOFNL), on-farm labor (TOTONL), and farm income (YFARM) contribute little to the overall relationship. Unlike other zones which exhibit a variety of crops with different monetary yields and labor requirements, farms in

Valsequillo do not have the option of planting labor-intensive crops, usually requiring more hired labor, in order to increase their monetary returns. This severs the link between the income which can be earned and the amount of labor which is hired, and leaves the proportion of hired to total farm labor primarily dependent upon available family labor and land size.

$$\begin{aligned} \text{HIRFAM} &= .483 - .189 \text{ NUMSUP} + .161 \text{ TOTOFNLN} + .655 \text{ YFARM} - .147 \text{ TOTONL} \\ \text{significance} &\quad (.001) \quad (.605) \quad (.481) \quad (.351) \\ \text{elasticity} &\quad (-.115) \quad (.032) \quad (.016) \quad (-.045) \\ R^2 &= .123 \quad F = 3.06 \text{ (significance} = .021) \end{aligned}$$

The model which was developed in Chapter II appears to adequately represent the major determinants of farm income, farm labor, and its division between hired and household labor. In Valsequillo, unlike Las Huastecas, these variables collapse into one, for farm size is the overwhelming factor determining farm labor and farm income. Being an essentially monocultural region, in which even small farmers rent machinery for some operations and consequently techniques do not differ significantly between farms, crop composition and agricultural capital do not play a major role in the zone.

3. OFF-FARM INCOME, LABOR, AND MIGRATION

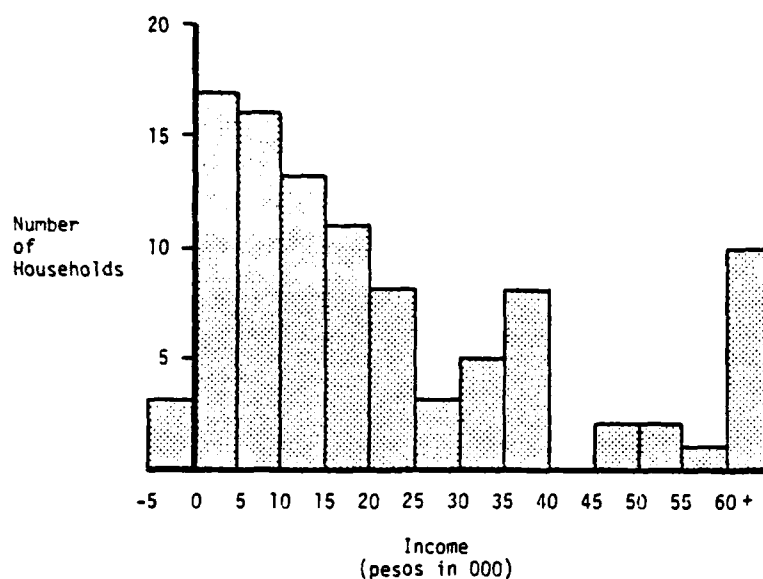
3.1 Off-Farm Income and Labor

While Valsequillo seems characteristic of what is often called "subsistence agriculture" because the primary crop is the

the major staple and is consumed by the household on the majority of farms, farm production is really an auxiliary operation for most households in the zone. Out of a total of 331 days worked by the average household, 253 days, or 78 percent, was applied off-farm. All of this labor was in waged occupations, and the average household earned \$12,293 pesos in off-farm activities. Seventy-nine households of the 99 engaged in wage labor, earning 74 percent of their total household income by this means. This important source of income tended to level the distribution of total household income (the sum of farm and wage income), as reflected in Figure 4-4.

We have noted on several occasions the uneven distribution of farm size and corresponding farm income in Valsequillo, though techniques and crops did not differ enough between the large and the small farms to require a separate discussion of farm income and labor. It is a different matter when it comes to off-farm labor, because the large farms generate enough income to provide an adequate standard of living for the household without wage labor. Fifteen households earned farm incomes over \$20,000 pesos, while average household expenditures for the entire sample were only \$13,506 pesos (\$2,639 pesos per household member). Since the focus of this study is on the wage labor activities of households in the peasant mode of production, it is necessary to differentiate clearly between those households dependent upon wage labor and those which are not. Table 4-4 stratifies the sample into two groups according to whether

FIGURE 4-4
Total Household Income Distribution: Valsequillo



they earned 25 percent of their total income off-farm, and presents mean values and their significant differences for major farm variables.

The differences between these two groups are striking, and confirm the analysis of the model developed in Chapter II when applied to Valsequillo. Those households which earn one-fourth or more of their income from wage labor have less than one hectare per

TABLE 4-4
Differences in Mean Values of Selected
Variables by Group: Valsequillo

Variable	Percentage Off-Farm In- come < .25 (n = 29)	Percentage Off-farm In- come \geq .25 (n = 70)	Significance level of Difference in Means*
Farm Income (pesos)	\$63,261	\$4,180	.005
Household Size/ hectare	.88	3.14	.050
Agricultural Capi- tal (pesos)	\$28,594	\$5,570	.066
Value Production/ ha. (pesos)	\$ 2,300	\$1,935	.027
Farm Income less Household Expen- ditures (pesos)	\$48,292	-\$8,720	.006
Household Labor/ ha. (days)	11	26	.004
Hired/Total Farm Labor	.56	.42	.038
Implicit Farm Income/ Day Household Labor (pesos)	\$ 137	\$ 72	.285

*T - test of pooled variance

household member 16 years old or greater, and earn less than \$5,000 pesos from farm production. This leaves them with a deficit in their household budget which must be met with off-farm income. They work more on their own farms, despite having less land, trying to maximize production and minimize the expense of hired labor, yet they still produce less per hectare and hire 42 percent of total farm labor inputs. They form the majority of farm

households in Valsequillo, and as such demonstrate the importance of wage labor to the peasant mode of production in this zone. Moreover, their dependence upon off-farm income results despite the fact that households in Valsequillo, receiving adequate water at least during one growing season, have an advantage relative to most households in the peasant mode in Mexico.

Total off-farm labor for the average household is divided between agricultural day labor and a wide variety of waged occupations, including construction labor, domestic labor, and similar types of unskilled labor. Of a total of 253 days of off-farm labor, 159 days, or 63 percent, were employed as jornaleros, with 67 days worked by the farmer and the rest by other members of the household. An even greater percentage of the households worked in agriculture, although those who labored in other sectors worked more days (188 days by the farmer as a laborer for 20 households versus 167 days as a jornalero for 40 households). The average wage paid in non-agricultural labor was \$48 pesos, while that in agriculture was \$34 pesos.

As in the previous zone it is difficult to assess the level of unemployment, because there is no detailed examination of labor force participation by each member of the household. For the sake of comparison, a participation rate of 1.0 for all household members 16 years of age or more could be used, by which standard each household member would have worked an average of 91 days. This is less than the average of 125 days for Las Huastecas under the same definition, although most of the labor in that zone was on-farm, while most labor

in Valsequillo was off-farm.

The best measure of employment is that of the household head who farms the land, although this measure probably overstates employment for other household members in the labor force. In Valsequillo, the average producer worked 148 days during the year of the interview, 43 days on his farm and 105 days off-farm. For a working year of 300 days, this indicates a rate of unemployment of slightly over 50 percent, far exceeding the 22 percent unemployment calculated for Las Huastecas.

The relationships developed to this point concerning farm income and labor are important for purposes of this study only as they affect the allocation of household labor between on- and off-farm activities, and within the latter category, among different occupations at different locations. As in the previous chapter, two variables which represent this labor allocation have been highlighted--the total amount of off-farm labor (TOTOFFL) per household, and the percentage of off-farm to total household labor (PEROFFLF). The two sets of factors that affect these dependent variables are the necessary level of household income and household farm labor inputs relative to family size. The results of a multiple regression of total off-farm labor on variables representing various dimensions of these factors is shown below.

Necessary off-farm income, as measured by household expenditures less farm income (DIFEGRF), is positively and significantly related to off-farm labor (TOTOFFL). Of the three variables which

$$\text{TOTOFFL} = 100.83 + .21 \text{ DIFEGRF} + 53.87 \text{ NUMMAY}$$

significance (.023) (.003)

elasticity (.016) (.718)

$$- 11.57 \text{ DUPTOT} + 40.38 \text{ HIRFAM}$$

(.163) (.666)

(-.181) (.066)

$$R^2 = .14 \quad F = 3.58 \text{ (significance} = .009)$$

together determine family farm labor, the family labor force (NUMMAY) is by far the most important, and is significant at the .003 level. Total land size (SUPTOT) and hired to total farm labor (HIRFAM) both exhibit the correct signs, but are not in themselves significantly related to the dependent variable. Labor appears to be hired by all farms in direct proportion to the seasonal availability of household labor relative to crop requirements, so that the ratio of hired to family labor is not a variable which the household may manipulate much. Remembering that changing the composition of crops or agricultural techniques are the primary means of altering seasonal labor requirements and therefore the amount of hired labor, it is not surprising that this variable should not contribute much to the relationship in this one-crop region. The overall relationship is significant at .009 level, although it does not explain a great deal of the variance of the dependent variable among farms.

The percentage of off-farm labor to total household labor is examined in the next regression. The number of household members 16 years old or more per hectare (NUMSUP) was significant at the .05

$$\text{PEROFFLF} = .55 + .152 \text{ NUMSUP} + .277 \text{ HIRFAM} + .349 \text{ DIFEGRF}$$

significance (.047) (.839) (.004)

elasticity (.061) (.020) (.011)

$$R^2 = .139 \quad F = 4.718 \text{ (significance} = .004)$$

level, but once again the ratio of hired to total farm labor did not contribute to the relationship. Expenditures less farm income was highly significant in explaining the percentage of off-farm labor.

In summary, it appears that farm size again plays a major role in the zone in determining the allocation of household labor to on- and off-farm activities. Small farms produce less income, creating a dependency of the household on wage labor, and require less work, freeing family members for these occupations. But due to the seasonal labor requirements of corn production (reference may be made to Chapter VI for the seasonality of labor inputs in corn, for seasonal labor data are not available for Valsequillo), even the small farms do not have enough household labor to perform all tasks, and must hire labor. Lacking alternative crops and techniques, the percentage of farm labor hired is primarily a function of the household labor force relative to land size, and the amount of time the household works off-farm. Variables in the model such as crop composition and agricultural capital, which are important to the amount and seasonal distribution of farm labor when cropping patterns can be altered, do not play a major role in Valsequillo. Important variables in the model collapse to land size and household size, which together determine necessary off-farm income and the amount of labor available for waged occupations, and thereby influence the

allocation of total household labor to on- and off-farm activities.

3.2 The Location of Off-Farm Labor

TABLE 4-5

Off-Farm Labor by Location: Valsequillo
(days/household)

	<u>Agricultural Day Labor</u>				
<u>Location</u>	<u>Farmer(#cases)</u>		<u>Family(#cases)</u>		<u>% Total Days</u>
Same Municipio	144	(28)	302	(28)	78.7
Within Region	213	(10)	223	(3)	17.6
Outside Region	192	(3)	--	--	<u>3.7</u>
					100.0
	<u>Non-Agricultural Labor</u>				
	<u>Farmer(#cases)</u>		<u>Family(#cases)</u>		<u>% Total Days</u>
Same Municipio	221	(9)	279	(16)	78.4
Within Region	191	(9)	--	--	20.9
Outside Region	29	(2)	--	--	<u>.7</u>
					100.0

Table 4-5 shows that, as in Las Huastecas, the majority of off-farm labor in Valsequillo is worked within the same municipio,

with only about 20 percent of either agricultural or non-agricultural labor in another municipio. Households with labor in other municipios do not tend to work more days, possibly reflecting the good transportation network which makes local travel relatively easy. Nor do wages in other areas differ significantly from local wages, averaging around \$34 pesos per day for agricultural labor and \$48 pesos for other occupations. Only those three households which worked outside the region earned a higher salary, at \$50 pesos per day. The majority of off-farm household labor was contributed by members other than the farmer, emphasizing the importance of total household labor force to the production of income. None of the households in our sample participated in migration to the United States.

In addition to these members of the household, eight households had an average of 1.75 members each temporarily absent, and six households had an average of 1.83 members permanently absent but who still sent money to help with household expenses. While we do not know the exact location of these members of the household, it is almost certain from the low level of remittances that none are in the United States. Ten households received remittances averaging \$6,966 pesos apiece, over half of the average expenditures of a household in the zone. The data do not permit a detailed examination of the position of each contributor in the extended household, and future research on household labor and migration should make these links explicit.

Thus we see that Valsequillo is not a zone which exhibits much migratory behavior. Most off-farm labor, whether agricultural or in other activities, is applied within the same municipio in which the household resides. Labor is exchanged within farms in the peasant mode and between the small and large farms, and part of the slack in this labor demand is taken up in non-agricultural activities. However, labor from all sources totals only 148 days for the farmer, and despite the implied low level of household employment, most households continue to work within the local area. Only a few households had members outside the region, and none were in the United States to our knowledge.

4. CONCLUSIONS

Were it not for irrigation, agriculture in Valsequillo could be a model of the peasant mode of production as is typically found in the Central Plateau of Mexico. Most farms are small, yet a few large farms dominate production and agricultural capital. The principal crops are corn and beans, the majority of which is consumed by the farm household. Farm incomes are too small to provide an adequate income for most households, so that wage labor plays an important role in the allocation of household labor.

Irrigation in Valsequillo, while not providing enough water to substantially alter the dominance of subsistence crops, has played a major role in the development and spread of technology. Being assured of adequate moisture for the principal season, 85 out

of 87 farmers farmers who planted corn realized a harvest (as opposed to 78 of 98 in Las Huastecas), thus permitting them to invest money in purchased inputs with a high expectation of a return to cover these expenses. Even the small farms rent machinery for some tasks, most use fertilizer or other purchased inputs, and hired labor plays a critical role in agricultural production. Thus the farm structure in Valsequillo appears to have reached an equilibrium with respect to the prevailing technology and climate: the small farms which are the majority provide labor to the larger farms, and the large farms provide technology in the form of rented machinery to the small farms. Monetary returns are not high enough to cause widespread takeover of land by the large farms, as has been witnessed in other zones (Barbosa-Ramírez and Maturana, 1972; also see Chapter VI).

A part of this equilibrium is that households in the peasant mode, in addition to hiring a substantial amount of labor to meet seasonal needs, must work off-farm for a majority of their income. Indeed, off-farm income was 75 percent of total income for the four out of every five farms which engaged in wage labor. Most wage labor was agricultural, but non-agricultural labor in a variety of occupations was also important in the zone.

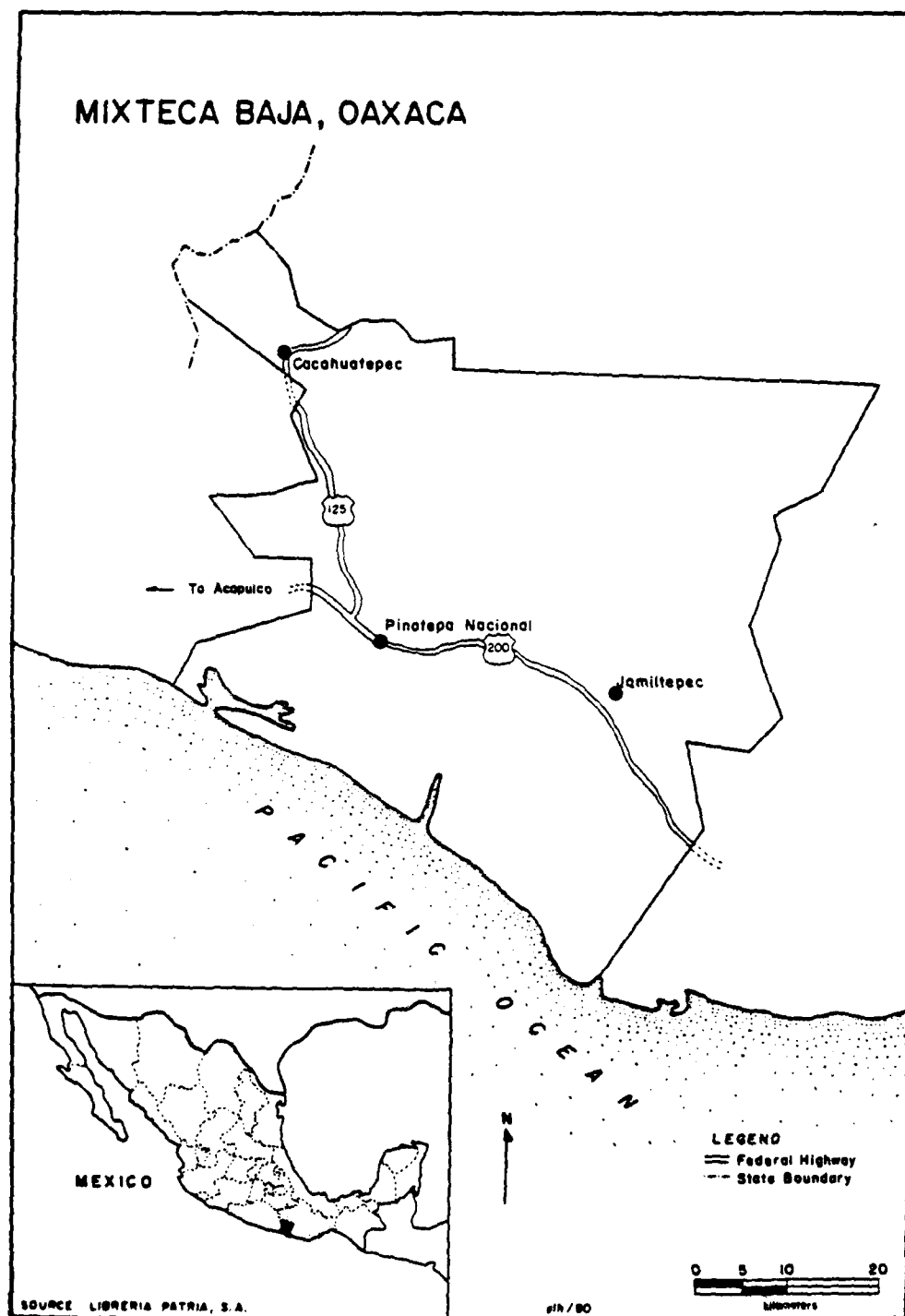
This examination of the household labor allocation model with the data from Valsequillo demonstrates the validity of the relationships posited there. Given the homogeneity of the technology employed and crops grown, farm income is primarily determined by land

size (the relative influence of land size almost double of that in Las Huastecas). Although the small farms apply more family labor to each hectare, they still hire a substantial amount of farm labor, much more than in Las Huastecas. The principal variables influencing the percentage of off-farm to total labor are the size of the family labor force relative to that of the farm, and the necessity of off-farm income.

It is too soon in the analysis to try to draw conclusions based upon the differences between Valsequillo and Las Huastecas, but the salient characteristic which will need to be explained should be emphasized. Labor patterns between the two zones differ mainly in three aspects: (1) The principal cultivator in Valsequillo was unemployed 55 percent of his working time, as compared to 23 percent for Las Huastecas; (2) 78 percent of total household labor was applied off-farm in Valsequillo, while only 33 percent of labor in Las Huastecas was off-farm, and (3) non-agricultural wage labor played a more important role in Valsequillo. Yet in both zones, almost all off-farm labor was within the region, and most within the same municipio. When we compare these two zones with areas which send a lot of labor to other regions, the similarities may be more interesting than the differences.

CHAPTER V
THE MIXTECA BAJA, OAXACA

Las Huastecas, San Luis Potosí, is a zone which is predominantly indigenous, but which exhibits a relatively productive and diversified agriculture, providing sufficient employment and income for the household either on their own plot or as jornaleros. The Mixteca Baja, on the southwest coast of the state of Oaxaca, is a culturally-mixed zone of mestizos, Mixtecos, and Blacks, and is poorer, almost entirely subsistence, and much more isolated from the cultural and economic mainstream of Mexico. The Centro de Investigaciones Agrarias selected the zone to represent an area for which "the principal characteristic was that the alternatives for non-agricultural work practically didn't exist or were extremely limited", and in which economic relationships of a "traditional" nature were predominant (Barbosa-Ramírez, 1976:191). In this zone will be encountered a situation which is representative of the poorest and most isolated regions of Mexico, such as are found in other areas of Oaxaca, Chiapas, and Guerrero. Examination of the patterns of off-farm employment in this zone will demonstrate the effects of a relative lack of direct articulation with the national economy, and of the dominance of traditional social relationships. It should also provide insight into why these very poor states send few migrants to the United States.



1. CHARACTERISTICS OF THE REGION

1.1 Physical Factors

The study zone encompasses 17 municipios of the Mixtec region of Oaxaca, which covers the southwestern quarter of the state. The zone extends from Cacahuatpec in the north to Pinotepa Nacional in the south and Jamiltepec in the west, thus encompassing both coastal and tropical mountainous regions. The coast in this zone is narrow, so that agriculture is practiced in small mountain valleys and on the hillsides. Corn is the major crop, with production of sesame, citrus fruit, cane, and coconuts also important. The area and yields of major crops is shown in Table 5-1.

TABLE 5-1

Major Crops and Yields: Mixteca Baja

<u>Crops</u>	<u>Area Cultivated (hectares)</u>	<u>(%)</u>	<u>Yield (kgs./ha.)</u>	<u>Value of Production (pesos)</u>	<u>(%)</u>
Corn	26,891	68.9	890	\$11,491,200	30.0
Sesame	7,153	18.3	591	8,525,742	22.3
Beans	2,242	5.8	381	133,400	.3
Peppers	552	1.4	64	2,165,500	5.7
Sugar Cane	541	1.4	4,995	1,351,150	3.5
Others	<u>1,639</u>	<u>4.2</u>	<u>--</u>	<u>14,629,112</u>	<u>38.2</u>
	39,018	100.0		38,296,104	100.0

Source: Barbosa-Ramírez, 1976.

1.2 Demographic and Cultural Factors

In 1970 the Mixteca Baja (or more properly, Mixteca Baja de la Costa) had 91,383 inhabitants in an area of 346,514 hectares, yielding a relatively low population density of 26.4 persons per square kilometer. Of those persons over five years old, 41 percent spoke an Indian language, primarily Mixtec, and 51 percent could be classified as indigenous according to this and other criteria employed by the Instituto Nacional Indigenista. In addition to the numerically superior Indian groups, Blacks are an important part of the cultural mix in the coastal municipios, and mestizos are predominant in the less-isolated areas and towns. Population, area, and the cultural composition of municipios in the study zone are shown in Table 5-2.

For most of the population, living standards are extremely poor, farm incomes are low, and the major waged occupation, jornalero labor, pays only about \$15 pesos per day, equivalent to \$1.20 dollars at prevailing exchange rates. Most dwellings consist of one room with a dirt floor, less than 10 percent have running water, and despite the presence of two towns of over 10,000 people, only about 20 percent of the homes have electricity.

Family size in the Mixteca Baja is smaller than either of the other two zones, averaging only about 5.3 persons per household, with 3.1 of these members 16 years old or more. This could be due to a recognized pattern of outmigration from the region: 43 of the

TABLE 5-2
Population, Area and Cultural Composition: Mixteca Baja

<u>Municipio</u>	<u>Popu- lation</u>	<u>Area (ha.)</u>	<u>Population Density (km.²)</u>	<u>Cultural Composition</u>		
				<u>Indian</u>	<u>Mestizo</u>	<u>Black</u>
Pinotepa de Dn. Luis	4,614	5103	90.4	73%	27%	--
S.A. Chayuco	3,226	10717	30.1	51	49	--
S.A. Huaxpaltepec	2,451	6762	36.3	47	53	--
S.A. Tepetlapa	2,410	6507	37.0	77	23	--
Cacahuatpec	5,537	15310	36.2	16	84	--
S.I. Colorado	5,481	8584	64.1	90	10	--
Sn. Lorenzo	3,850	8931	43.1	87	13	--
S.M. Tlacamama	2,152	10844	19.9	31	69	--
S.P. Atoyac	2,581	9441	27.3	71	29	--
S.P. Sicayón	6,189	6507	95.1	100	--	--
S.S. Ixcapa	3,123	10462	29.9	10	71	19
S.C. Mechoacán	2,417	6124	39.5	100	--	--
S.M. Huazolotitlán	6,464	32278	20.0	48	31	21
S. Ixtlayutla	4,469	36744	12.2	73	27	--
S. Jamiltepec	10,984	62260	17.6	35	36	28
Pinotepa Nacional	22,141	71956	30.8	27	41	32
S. Tetepec	<u>3,294</u>	<u>38020</u>	<u>8.7</u>	<u>52</u>	<u>48</u>	<u>--</u>
Total	91,383	346514	26.4	51%	36%	13%

Source: Barbosa-Ramírez, 1976.

75 municipios in the larger region of the Mixteca Baja lost population between 1960 and 1970 (Aguilar, 1974). This migration has most often involved young members of the household, both males and female, migrating permanently to Mexico City or Acapulco (Butterworth, 1975).

The level of education in the zone is also extremely low, 2.1 years of schooling for each family member 16 years old or more.

1.3 Economic Factors

Of the total labor force in the zone of 21,903 persons in 1970, 79.4 percent were occupied in agriculture, 6.9 percent in industry, 4.8 percent in services, and the rest in miscellaneous occupations. Even "industrial" occupations employed a low level of technology, dominated by textiles woven at home or in local shops, and brickmaking. Thus the occupational composition of the zone is similar to that of Las Huastecas.

The agricultural situation, however, is quite different. In Las Huastecas, ejidal land has been parcelled out to individual ejidatarios, who farm the same plot year after year. In the Mixteca Baja, although most of the land is ejidal and farmed individually, plots are assigned each year to the ejidal household according to the area which they can work. This corresponds to the terrain and the technology used in cultivation, for only a small portion of the total area of the ejido is farmed each year. The ejidatario is usually assigned from 1.5 to 3 hectares, cuts the trees and brush on this land, and burns it. The land is then cross-plowed by animals if in a level valley, or planted for corn with a primitive digging stick if on a hillside. It may be cultivated one or two years, and then left fallow for up to ten years. This "slash and burn" technique of cultivation has not changed significantly since the Colonial epoch.

The influence of traditional cultural relationships is apparent in other aspects of the regional economy. The institution of tequio, in which labor is donated by members of the community for building roads, schools, administration buildings, and churches, is important in the Indian communities, although its importance is diminishing over time and almost non-existent in the larger towns. There is still mutual cooperation among households in farming, though this too is being replaced by wage labor. Family heads are expected to participate in time-consuming community offices (cargos). Overall, for the Indian strata of the survey, 39 percent of the off-farm labor of the household head was occupied in cargos, 9 percent in tequio, 9 percent in mutual help, and 43 percent in wage labor. In our analysis, mutual help in farm labor is grouped with household labor, while the data do not permit a detailed analysis of unpaid labor in community service.

Transportation of persons for work and marketing is limited by an extremely poor system of roads. Only the coastal road is paved, and the rest, winding through mountainous terrain, are difficult or impossible to travel by conventional means. The CDIA estimated that 20,600 people were not linked to the outside by a road of any sort.

Isolated and without major sources of employment other than low-paid agriculture, households in the Mixteca Baja find it difficult to obtain an adequate source of cash income. Only sesame is a

commercial crop, and it was grown by 43 percent of the households in our sample. Weaving of Indian garments by women, sold locally in the markets to tourists, also provides a supplementary source of income. Thus the zone bears none of the characteristics of the capitalist mode of production, but is instead almost entirely isolated from the economic and cultural mainstream of Mexico.

2. FARM INCOME AND LABOR USE

2.1 Basic Characteristics

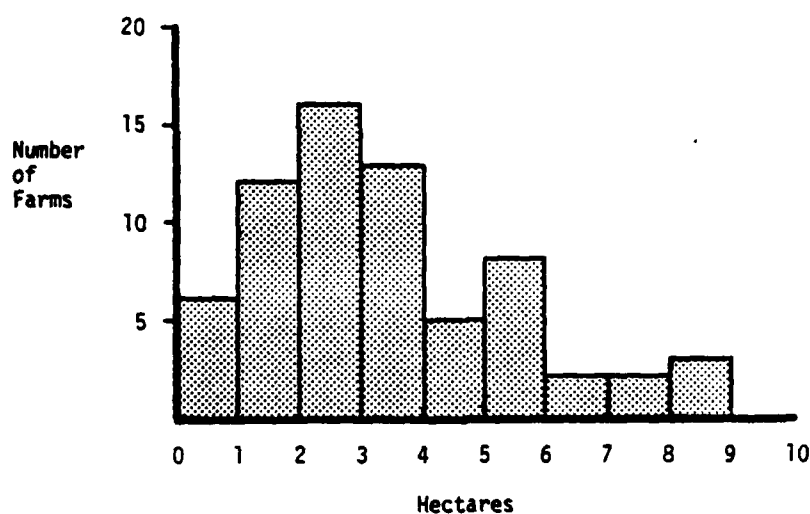
The CDIA sample in the Mixteca Baja was smaller than in the other zones, and only 67 cases could be obtained for analysis. However, given the homogeneity of the zone, this sample should be sufficient for statistical significance in most of the analyses which will be undertaken.

The system of land allocation prevalent in the ejidos of the zone has been described, in which a small plot is cleared and cultivated each year. The average amount of land cultivated per household in 1974 was 2.8 hectares, with most plots between one and four hectares, shown in Figures 5-1.

Each zone has had its peculiar agricultural features which have strongly influenced farm incomes and patterns of labor use. In Valsequillo, land size was the overriding factor, while in Las Huastecas, the composition of crops played a decisive role. For the Mixteca Baja, it is clear that the social and technological conditions that limit the amount of cultivated land to a minimal number

of hectares severely curtail the potential for earning an adequate income from agriculture. The labor required to prepare land for planting is arduous, and sufficient land must be maintained fallow by the community to ensure that the productive process may continue. Land size is not an important independent variable affecting crop composition and agricultural capital as it was in the other zones, and it plays a much less significant role in household labor allocation.

FIGURE 5-1
Cultivated Land: Mixteca Baja



Most farms possessed agricultural implements, valued at \$455 pesos per farm, and half had animals which were used for agricultural work, valued at \$3,264 pesos on these farms. The total value of agricultural capital per hectare was \$907 pesos, higher than that of Las Huastecas, because in that zone land size was larger and not all was cultivated. However, inputs of fertilizer, seeds, and machinery

were very low, summing to only \$75 pesos per hectare. As will be shown, practically the only farm input of any significance purchased by the household was labor.

The composite farm in the sample would have had under cultivation all of the cleared land, utilizing the agricultural cycle to its fullest by planting beans, chili, or sesame as soon as the corn is doubled-over for drying on the stalk. Thus the sum of the land in corn (2.2 hectares), beans (.4 hectares), sesame (.8 hectares) and "others" (.3 hectares) exceeds the total area of the composite farm. By the measure of crop composition employed throughout this study, farmers in the Mixteca Baja put 76 percent of their land in subsistence crops (corn and beans), higher than Las Huastecas but lower than Valsequillo. But by other measures, the zone is far more subsistence-oriented than Valsequillo. All of the households in the sample grew corn, and the average household sold only 16 percent of their production of corn, compared to 37 percent in Valsequillo. Because there were no large farms to dominate commercial production, less than one-third of the total production of our sample was marketed, while in Valsequillo 72 percent was marketed. Sesame was the only significant commercial crop, with 89 percent marketed, and "other" includes citrus, coconuts, mangos and chiles, of which a large percentage of production was sold.

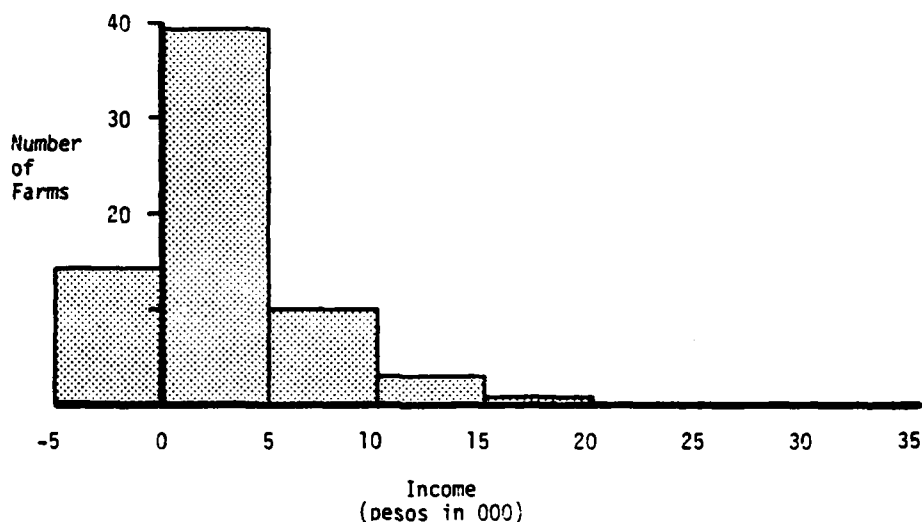
The use of primitive techniques on poor land is most telling in the value of production per hectare--\$1,234 pesos overall in the zone and only \$958 pesos for corn. For comparison, Las Huastecas produced \$1,849 pesos per hectare in corn, and Valsequillo exceeded that with \$2,332 pesos. It might be expected that this lower value would be compensated for by a lower level of expenses, but households in the Mixteca Baja hired more labor than in the other indigenous zone. Production is necessarily more labor-intensive, and an average of \$635 pesos per hectare was spent on purchased inputs including labor. This leaves a net return of only \$323 pesos per hectare from corn production. Other crops fared only slightly better. Thus farms are poorer in the Mixteca Baja because they are smaller, produce less per hectare, and spend more on labor in the process.

2.2 Farm Income

These factors combine to produce a level of farm income in the Mixteca Baja which is by far the lowest of any of the zones studied. Average farm income was \$2,639 pesos (or \$211 dollars at the prevailing exchange rate), and all but four of the farms had incomes of less than \$10,000 pesos. The concentration of farm income in the lower brackets and the substantial number of farms which earned a negative income are shown in Figure 5-2.

The path analysis of the determinants of farm income in the Mixteca Baja confirms the relatively low influence of land size

FIGURE 5-2
Farm Income Distribution: Mixteca Baja



when compared to that in Valsequillo, and of crop composition when compared to Las Huastecas. Land size positively affects farm income directly, and also positively through its effect upon crop composition. All of these effects are relatively minor due to the low variability of farm income among farms. Thus the model explained only 29 percent of the variance in the dependent variable.

Farms in the Mixteca Baja generated only \$951 pesos for each hectare cultivated, after subtracting all monetary expenses. A regression of farm income per hectare (YFARMH) on land size (SUPTOT), crop composition (CRPCOMS), agricultural capital per hectare (KLRATIO) and purchased inputs (excluding labor) per hectare (PITOTH) yields the following:

$$Y_{FARMH} = -178.6 + 61.99 \text{ SUPTOT} + 915.43 \text{ CRPCOMS}$$

significance (.627) (.389)

elasticity (.184) (.734)

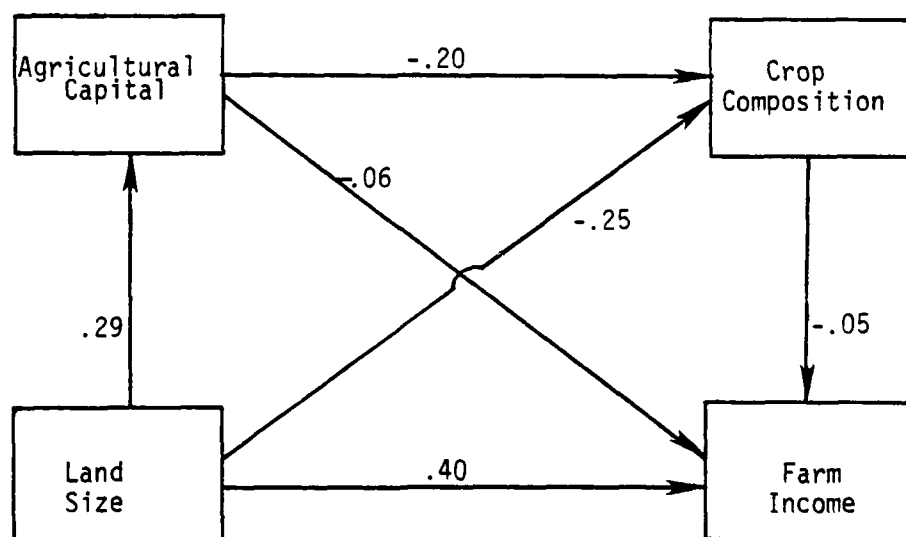
$$+ .42 \text{ KLRATIO} - 1.69 \text{ PITOTH}$$

(.002) (.502)

(.403) (-.133)

$$R^2 = .16 \quad F = 2.88 \text{ (significance} = .025\text{)}$$

Figure 5-3
Path Analysis of Farm Income: Mixteca Baja



While the overall relationship was significant, the only individual variable significant was the amount of capital per hectare. The relationship only explained 16 percent of the variance

in the dependent variable, because basic techniques differed so little among farms that changes in farm income per hectare were mainly due to factors outside the farmer's control.

Generalizations about farm income in the Mixteca Baja are relatively easy to make compared to the other zones. Techniques are primitive, resulting in low yields, and when combined with extremely small plots of land generate levels of income for most households which are insufficient for subsistence. The primary purpose of agricultural production is to grow corn for the household's own needs, and little monetary income is generated on the farm. One could expect to find off-farm income very important to household survival, but this potential supply of household labor is located in a zone with a poorly-developed infrastructure and few opportunities for off-farm employment.

2.3 Farm Labor

The average household in the sample worked 171 days on their farm, two-thirds of their total on- and off-farm labor. In addition to household labor, 67 percent of the farms hired labor, adding 68 days to bring total farm labor inputs to 240 days. For those 45 farms which used wage labor, 39 percent of their total farm labor inputs were hired. Hired labor was thus even more important to production than in Las Huastecas, although much less than in Valsequillo.

TABLE 5-3

Farm Labor Inputs by Crop and
Category of Worker: Mixteca Baja
(days)

	<u>Corn (%)</u>		<u>Beans (%)</u>		<u>Sesame (%)</u>		<u>Others (%)</u>	
(Number of Farms)	(67)		(24)		(29)		(22)	
Farmer	83	(47)	21	(44)	11	(28)	44	(50)
Family Labor	44	(25)	4	(8)	17	(44)	27	(31)
Hired Labor	<u>50</u>	<u>(28)</u>	<u>23</u>	<u>(48)</u>	<u>11</u>	<u>(28)</u>	<u>17</u>	<u>(19)</u>
Total Labor	177	(100)	48	(100)	39	(100)	88	(100)

Table 5-3 shows labor inputs in corn exceeded that of other crops and, in addition, were relatively high when compared to the other two zones, which each had about 125 days of corn labor per household. Part of this difference can be explained by the intensive labor applied in preparing the land, which is not allocated to other crops because they often follow corn or are interspersed with it. When added to these statistics is the fact that the average plot of land cultivated is only 2.8 hectares, the labor-intensive nature of agricultural production in the zone becomes even more dramatic: the household applied 84 days per hectare of its own labor and hired jornaleros for 37 more days, resulting in a total labor input of 118 days per hectare. This compares with 37 days in Valsequillo and 75 days in Las Huastecas.

In each zone the implicit wage of household labor in agricultural production has been calculated, which is useful for

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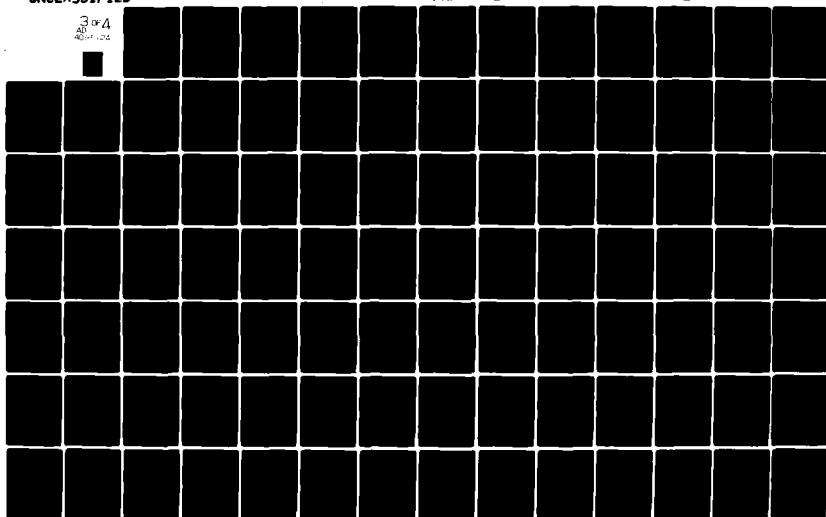
DEPARTMENT OF STATE WASHINGTON DC OFFICE OF EXTERNAL--ETC F/G 5/11
AGRARIAN STRUCTURE AND LABOR MIGRATION IN RURAL MEXICO: THE CAS--ETC(U)
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comparative purposes if we bear in mind that these averages can mask wide differences among farms. In Las Huastecas, this value was \$61 pesos per day, calculated as net farm income divided by household labor inputs. In Valsequillo, it rose to \$91 pesos, because of the labor-extensive nature of production. If only those farms with positive farm incomes are included in the calculation, the implicit wage in the Mixteca Baja was only \$37 pesos per day, while if the entire sample is included, it takes a negative value (apparently those farms with losses worked fewer days, with the direction of causality probably from loss of the crop to lower labor inputs). While this exceeds the average wage paid to jornalero labor (\$17 pesos for the sample), it must be reduced by the substantial probability of obtaining a negative farm income. Thus the average remuneration of household farm labor is extremely low.

Perhaps a clearer understanding of the determinants of the high level of labor inputs may be gained by examining a regression of total labor per hectare (TOTLABH) on the major variables hypothesized in the labor-allocation model to determine it: land size (SUPTOT), agricultural capital (KLRATIO and PITOTH), crop composition (CRPCOMS), and the number of household members 16 years or older (NUMMAY).

The following regression shows that labor is applied more intensively as land size decreases, agricultural capital decreases, and household labor force increases. The coefficients and significance of land size and household size cannot be evaluated

independently, for the two are correlated due to the system of land allocation. But the overall significance of the relationship shows that land is not "unlimited" in the zone--that apparently the community imposes restrictions against working more land, so that households must work the land allocated more intensively.

$$\begin{array}{l} \text{TOTLABH} = 245.2 - 28.8 \text{ SUPTOT} + .93 \text{ KLRATIO} - .24 \text{ PITOTH} \\ \text{significance} \quad (.000) \quad (.145) \quad (.049) \\ \text{elasticity} \quad (-.691) \quad (.071) \quad (-.155) \end{array}$$

$$\begin{array}{l} + 5.69 \text{ NUMMAY} - 70.7 \text{ CRPCOMS} \\ (.465) \quad (.178) \\ (.153) \quad (-.457) \end{array}$$

$$R^2 = .31 \quad F = 5.49 \text{ (significance} = .001)$$

The ratio of hired to total labor averaged 26 percent for all farms, and 34 percent for those 45 farms which hired labor. It seems ironic that farms producing so little income would hire labor, but the percentage of hired labor even exceeds that of Las Huastecas.

The labor allocation model relates the ratio of hired to total farm labor (HIRFAM) positively to farm income (YFARM), total farm labor per hectare (TOTLABH), and household off-farm labor per person (TOTOFFLN), while it is related negatively to the family labor force per hectare (NUMSUP). The multiple regression below shows all of these variables except off-farm labor to be significant at the .01 level, and the overall relationship to be highly significant.

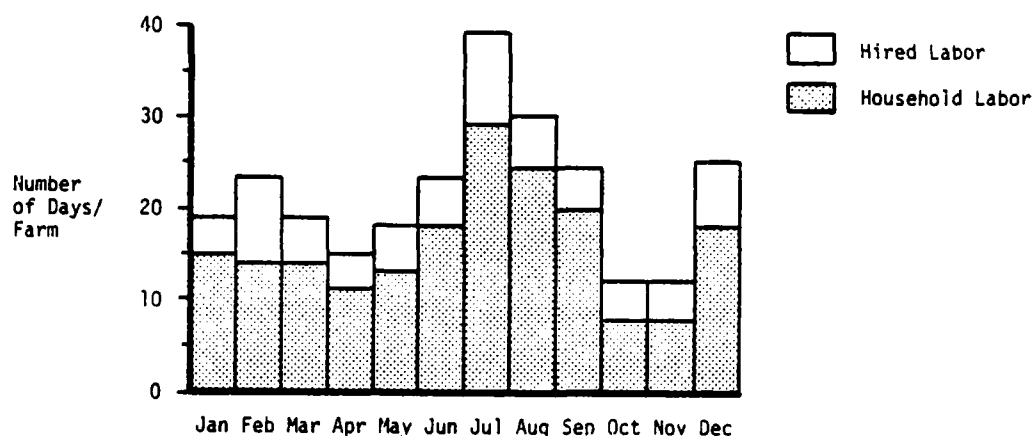
Farm income, however, has the wrong sign. The sign is hypothesized to be positive (and was in the other two zones) because farms with low incomes could not afford hired labor, but in the Mixteca Baja labor appears to be hired beyond the point where it is economical. Thus hired labor increases expenses and reduces incomes. Given that few purchased inputs are employed other than labor, this is a major cause of the negative incomes observed on a number of farms.

$$\begin{aligned} \text{HIRFAM} &= .34 - .23 \text{ YFARM} + .63 \text{ TOTLABH} + .10 \text{ TOTFLN} - .72 \text{ NUMSUP} \\ \text{significance} &\quad (.008) \quad (.082) \quad (.160) \quad (.012) \\ \text{elasticity} &\quad (-.229) \quad (.282) \quad (.121) \quad (-.470) \\ R^2 &= .22 \quad F = 4.43 \text{ (significance} = .003) \end{aligned}$$

There are two possible explanations for the fact that a majority of farms hire labor despite the uncertainty of production which may cause a monetary loss if the crop does not produce. Labor may be concentrated in certain seasons, exceeding the family labor supply, or hired labor may be used to allow the family to work more off-farm. The second proposition is supported by the regression above, and will be examined in the following section, while the first may be examined through the data presented in Figure 5-3, showing the seasonality of labor in the Mixteca Baja.

Except for the months of February, July, and December, corresponding respectively to the periods of land preparation for planting, weeding, and harvesting, a relatively constant proportion

FIGURE 5-4
Seasonality of Farm Labor Use: Mixteca Baja



of total labor inputs are hired. Household labor in July exceeds total labor inputs for all other months, indicating that most households could, if they wished, meet almost all seasonal labor requirements without resorting to hired labor. This assumes, however, that all household members are equal for all tasks, for the increase in household labor during the summer months for the task of weeding could be contributed by women and children. Nevertheless, this does not explain why labor is hired even in slack months, indicating that the necessity for off-farm employment must also play an important role.

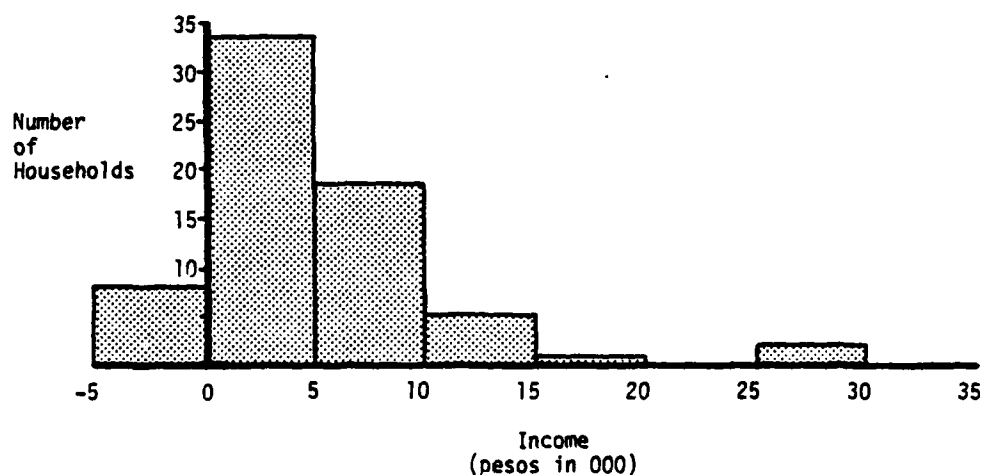
3. OFF-FARM INCOME, LABOR, AND MIGRATION

3.1 Off-Farm Income and Labor

Out of a total of 259 days worked by the average household in the Mixteca Baja, 88 days, or 34 percent, was applied off-farm in

income-producing activities. (The data does not permit analysis of unpaid labor, which is also important in the zone, but this will only bias the total employment figures, and not the wage-labor component). This labor produced an income of \$2,329 pesos, which when added to farm income, results in a total household income of only \$4,915 pesos. Figure 5-5 shows income to be heavily concentrated in the lower ranges, and that unlike the other zones, there were few households which were relatively advantaged.

FIGURE 5-5
Total Household Income Distribution: Mixteca Baja



In both Las Huastecas and Valsequillo, significant differences were found between farms dependent upon wage labor and those which were not. The entire sample of the Mixteca Baja bears closer resemblance to the lower strata of both of these zones,

except that it is even poorer. Farm income was \$4,180 pesos for the lower strata in Valsequillo and \$12,817 pesos on the average in Las Huastecas, compared to \$2,639 pesos for the average farm in the Mixteca Baja. But in Valsequillo, households compensated by working and earning much more off-farm (78 percent of their total labor for those households working off-farm), while in the Mixteca Baja the 46 households engaging in wage-labor worked only 44 percent of their time in this activity. The lack of opportunity for off-farm labor combines with low salaries (\$15 pesos for local agricultural work) and low farm incomes to produce extremely low levels of household income.

If an overall index of unemployment were to be constructed as in the other two zones, including all household members 16 years or over in the household labor force, each member would have worked 82 days during the year. This is lower even than Valsequillo, which averaged 91 days, and far below the 125 days of Las Huastecas.

By the employment measure of days worked by the family head, the zone fared relatively better than indicated by the index above. This is because other family members worked less than in the other zones, particularly in off-farm labor. The producer worked an average of 110 days on the farm, 40 days off-farm, and according to the CDIA study, an additional 48 days in unpaid labor, for a total of 198 days. Wage labor was even less significant than in Las Huastecas, despite a large difference in farm incomes, and most labor was on-farm although at an extremely low implicit wage. It is clear

that the opportunities for earning an adequate level of income either through farm production or in off-farm labor are extremely limited.

The household labor allocation model hypothesizes that off-farm labor is related to two sets of factors--the necessary level of household income, and household labor supply relative to family on-farm labor. In this zone there is no data on household expenditures, so necessary off-farm income will be related negatively to farm income. A regression of total off-farm household labor (TOTOFFL) on farm income (YFARM), the number of household members 16 years old or more (NUMMAY), and family on-farm labor (FAMONL) gives the following results:

$$\begin{aligned} \text{TOTOFFL} &= 2.05 - .55 \text{ YFARM} + 39.5 \text{ NUMMAY} - .14 \text{ FAMONL} \\ \text{significance} &\quad (.216) \quad (.002) \quad (.242) \\ \text{elasticity} &\quad (-.168) \quad (1.42) \quad (-.277) \\ R^2 &= .16 \quad F = 3.98 \text{ (significance} = .012) \end{aligned}$$

As in the other zones, the directions of the relationships are as predicted and the overall relationship is significant. The most significant individual variable is the size of the family labor force, although in this zone necessary off-farm income was not as significant a predictor as in the others. The zone differs in this regard because even those households with relatively high farm incomes have absolute levels of this variable which are very low, and because wage-labor opportunities are limited.

The allocation of household labor between on- and off-farm labor activities is examined in the next regression.

$$\begin{aligned} \text{PEROFFLF} &= .15 - .21 \text{ YFARM} + .26 \text{ NUMSUP} + .40 \text{ HIRFAM} \\ \text{significance} &\quad (.839) \quad (.388) \quad (.008) \\ \text{elasticity} &\quad (-.019) \quad (.151) \quad (.352) \\ R^2 &= .16 \quad F = 3.98 \text{ (significance} = .030) \end{aligned}$$

From the low coefficient for farm income (YFARM) we can conclude that this variable has little influence upon the percentage of total household labor worked off-farm (PEROFFLF), again emphasizing that low absolute level of income for most farms in the sample negates any differential effect upon labor allocation. Family labor force relative to farm size (NUMSUP) exerts a positive effect, and the percentage of hired to total farm labor (HIRFAM) positively and significantly affects the amount of household labor allocated off-farm. This supports the hypothesis developed in the previous section to explain the relatively high percentage of farm labor hired in the Mixteca Baja and its constant distribution throughout the year-- labor is hired to enable household members to obtain an off-farm source of income. Farm income is so low that the household must work off-farm throughout the year to obtain cash to meet the necessities of life, even if this means hiring labor. Farm production thus sharply contrasts with wage labor; the former is almost entirely subsistence, providing the household with corn to ensure a

supply of the basic staple, while wage labor provides the cash to purchase commodities and hire labor. Hired labor thus plays a pivotal role in the zone in allowing the household to produce a monetary income.

3.2 The Location of Off-Farm Labor

Most household wage labor was employed within the same municipio in agricultural activities. Table 5-4 shows only ten households worked outside the municipio, reflecting the difficulty of transportation within the region, and the fact that there appears to be no monetary gain from working outside the community.

TABLE 5-4
Off-Farm Labor by Location: Mixteca Baja

<u>Location</u>	<u>Number of Households</u>	<u>Days Worked/ Household</u>	<u>Income (pesos)</u>	<u>Wage/ Day</u>
Same Municipio	32	65	\$1461	\$22
Within Region	9	65	\$1204	\$19
Outside Region	1	40	\$2400	\$60

In addition to these local sources of off-farm employment, almost one-fourth of the households in our sample had members temporarily absent, averaging 1.7 members apiece for each of these families. This is a higher percentage of households than for either of the previously analyzed zones, and supports the literature which shows the Mixteca Baja to be a region of high expulsion of labor. Opportunities for employment within the zone are

insufficient to provide an adequate income for all household members.

Thus the pattern of labor mobility in the Mixteca Baja differs from that of the other two zones; Las Huastecas exhibited a diversified agriculture, permitting an adequate income to be earned by combining jornalero labor with farm production, while in Valsequillo labor was concentrated off-farm, though in a variety of activities corresponding to its more diversified economy. In the Mixteca Baja, neither farm production nor wage-labor yielded a total income which could be considered adequate by national standards. Consequently, permanent out-migration or long-term temporary absence were the only alternatives for these households. The destination of this migration was most often Acapulco, Mexico City, or seasonal jornalero labor within the state on larger plantations. None of these households had members who had worked in the United States, which is not surprising given the physical and cultural distance separating the zone from the U.S. economy.

4. CONCLUSIONS

In each of the zones studied so far we have encountered different situations with respect to the agricultural mode of production and its articulation with the regional and national economy. Valsequillo had reached a type of balance between the capitalist and peasant agricultural modes, and was integrated with

the national economy through sale of agricultural products from the capitalist mode and by labor supplied from the peasant mode. Las Huastecas, an indigenous community, remained separate from the national economy except through the sale of coffee and sugar cane, and agriculture provided an adequate income to most households in the peasant mode either in their own farms or as jornaleros. The Mixteca Baja, in contrast, is a zone in which the peasant mode is almost entirely isolated from the economic mainstream of Mexico, and which has no value for commercial production except in a few areas. Techniques can only be described as primitive, corresponding to the poor agricultural conditions, and most production is for consumption. Neither agriculture nor other sectors provide many opportunities for off-farm employment. The Mixteca Baja exemplifies the traditional sector typified in the dual-economy models, in which the household had to permanently migrate in order to integrate with the modern sector.

Cultural influences are more important in the Mixteca Baja than in other regions, including Las Huastecas. Land is allocated to each household by the community, so that land size does not vary enough to become an important determinant of household labor allocation. Households work their land intensively, because a heavy labor input is necessary to clear the land for production. The two major variables explaining household labor allocation patterns were

the size of the family labor force and the amount of hired labor, the latter of which was important to enable household members to work off-farm. The household had to maintain a precarious balance between the risks of not having enough subsistence production and not having enough cash, and obtained about half of their total income from each of these sources.

Under these conditions migration was weighted heavily toward longer-term circular migration or permanent stays in distant urban areas where parallel community networks exist. Limited by language, culture and location, the population has not yet attained the degree of labor mobility to enable them to engage in short-term circular migration in more productive activities.

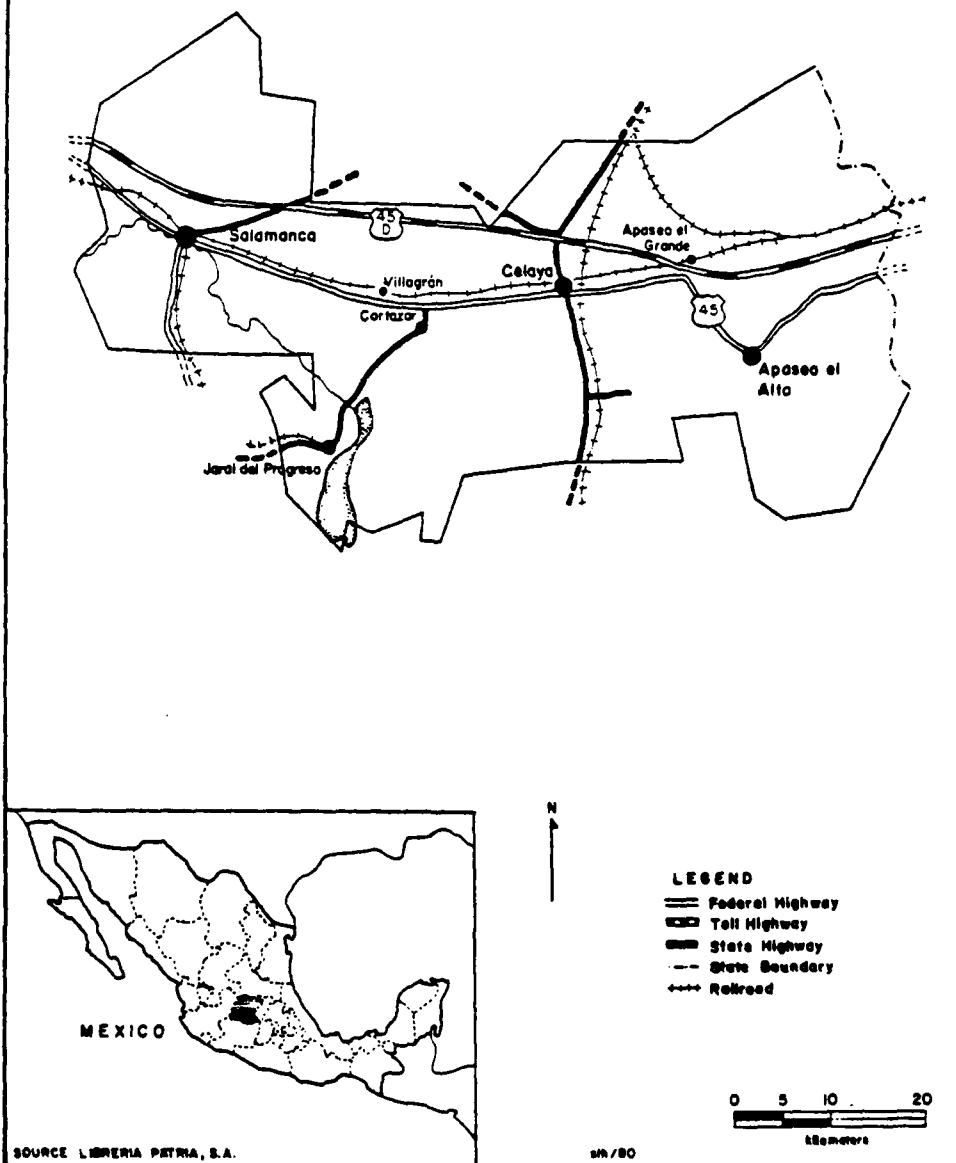
CHAPTER VI

THE BAJIO, GUANAJUATO

The Bajío is by far the most commercially developed zone of the four surveyed in this study. It has played an important role in Mexican history, for it provided food for the workers and grain for the mules which labored in the most productive mines of Mexico for two centuries. It is an area well-endowed for this purpose, possessing deep, fertile soils in a valley through which the Lerma River flows and permits irrigation for crops in the winter cycle. In 1811, Humboldt observed, "In Mexico, the best cultivated fields... are those which surround the richest mines of the known world" (quoted in Wolf, 1955: 183). It has long been integrated into the commercial system of Mexico, erasing most traces of the Indian culture of the pre-Conquest period, and it now exhibits a diversified agriculture in addition to strong industrial and commercial centers in Celaya, and Salamanca, Irapuato, León and Querétaro. Cauthorn and Hubbard (1976) predict the zone will be one of the "growth poles" of Mexico.

However, this relative prosperity has not been equally distributed among the population of the region. On the contrary, the large degree of social and economic heterogeneity in the Bajío has been commented upon in several studies. Barbosa-Ramírez (1973) characterizes it as a polarized agricultural zone, Baring-Gould (1974) emphasizes the growing gap between the ejido community

EL BAJIO, GUANAJUATO



structure and modern agriculture, and Díaz-Polanco and Montandon say it is "a zone where relatively modern agriculture and a dynamic and modern commercial sector are combined with peasant communities at various levels of development" (1977: 9). The data presented in this chapter will confirm these observations.

Most important for the purposes of this study, the Bajío is one of the major sending regions for migration to the United States. This chapter will determine which of the farm households are sending migrants to the U.S., and contrast their characteristics with those engaging in different patterns of household labor allocation. The concluding chapter will contrast the Bajío with the other zones of this study, in order to determine the regional factors which cause the Bajío to be a major sending area for U.S. migration.

1. CHARACTERISTICS OF THE REGION

1.1 Physical Factors

The Bajío is a loosely defined area encompassing the fertile valley of the Lerma River and the surrounding hills, and includes the southern part of the state of Guanajuato and parts of Michoacán and Jalisco. This study focuses upon the economic district of Celaya, which contains 7 municipios lying near the main highway from about 25 kilometers east of Celaya to a few kilometers west of Salamanca. This highway runs down the middle of the valley, and except for the eastern extremity, land in the valley is fertile, level, and ideal for cultivation. Most municipios, however, also

contain land on the hillsides that is poor and rocky, and large areas of the two eastern municipios are unirrigated and of low fertility.

The rich irrigated bottomland and the unirrigated periphery form two distinct agricultural sub-systems. The former grows a variety of crops, including corn, sorghum, wheat, alfalfa, and vegetables, employing modern technology and irrigation. The latter grows primarily corn and beans, using mainly animal traction and few purchased inputs. While ejidos are found on both types of land, the private farms in the valley tend to be large, while those in the hillsides are very small. The former was the area of the hacienda before the Revolution; the latter of the small independent ranchos (Wolf, 1955).

Irrigation is critical to the high productivity of the valley lowlands. Long before the techniques of the Green Revolution had been introduced into the Bajío, Castillo remarked, "Irrigation... creates the necessary conditions for the introduction of modern technology" (1956: 20). The 1970 Agricultural Census showed 36 percent of the cropland in the zone was irrigated. Of this irrigated land, slightly more than half was on private farms, of which almost all were greater than 5 hectares.

1.2 Demographic and Cultural Factors

The population of the municipios of this study, covering an area of 2,766 square kilometers, was 277,365 persons in 1970. The overall population density was about 100 persons per square

kilometer, but density varied greatly between urbanized and closely settled areas of the valley and the sparsely populated hillsides. The two large towns of Celaya and Salamanca contained a large percentage of the population, and much of the remainder was concentrated in the smaller towns or in small surrounding ranchos. By the census definition of an urban locale as communities of over 2,500 people, 56.2 percent of the population was urban in 1970. Although many of these small communities would more properly be classified as rural, the Bajío is by far the most urban of any of the zones surveyed in this study.

TABLE 6-1
Population, Area, and Urbanization: Bajío

Municipio	Area (hectares)	Population	Density (persons/ km. ²)	Pop. Urban	Percent Urban
Apaseo el Alto	45110	22320	49.3	6083	26.9
Apaseo el Grande	36730	24281	66.1	5397	22.2
Celaya	57930	98548	170.1	70765	72.2
Salamanca	77400	67097	86.7	35435	52.8
Jaral del Progreso	15280	15646	102.4	7055	45.1
Cortazar	34260	33605	98.1	21484	63.9
Villagrán	9860	15868	160.9	9536	60.1
Total	276570	277365	100.3	155755	56.2

Source: 1970 Censo de Población, México

The average household in the survey was comprised of 8.0 persons, 5.4 of which were 16 years old or more. Household size in

the other zones of this study was significantly less than in the Bajío, reflecting differences in economic and cultural factors which should be investigated further. Education, at 4.3 years of school for each household member 16 years old or more, was higher than in the other zones. Over three-quarters of these persons were literate.

The study zone exhibits few characteristics of indigenous culture found in the Mixteca Baja or Las Huastecas. Wolf (1955) says that this zone was never heavily populated before the Conquest, and aspects of Indian culture which remained were erased by the Spaniards in an attempt to control labor for the mines and haciendas. Indian dress was forbidden in the eighteenth century to force the indigenous population to work in order to buy clothes in the marketplace. A census in 1806 showed 56 percent of the Indians in the Intendancy of Guanajuato were not subject to the jurisdiction of a corporate peasant community (indios de pueblo), but were "free" laborers. Less than one percent of the indigenous populations of the Intendancies of Puebla, Oaxaca, Guadalajara and Mexico fell in this category (Wolf, 1955: 190).

1.3 Economic Factors

The survey area of seven municipios of the Bajío is a well-diversified zone that is highly integrated into the commercial economy. It has two important towns, Salamanca and Celaya. The former is built around a major petrochemical industry, and received 56 percent of investment in the state in 1970, while the latter is a

commercial center serving the agricultural economy of the zone. Most of the major national banks, agricultural implement companies, and seed and fertilizer distributors are represented in the area, and there are several packing plants processing vegetables and grains for domestic and international consumption. The zone possesses an excellent system of roads in the lowlands, and is connected to Guadalajara via Irapuato and to Mexico City via Querétaro by one of the principal highways in Mexico.

Table 6-2 shows that most of the labor force in the Bajío is employed in agriculture, but that industry, commerce and services are important in Celaya and Salamanca. The two eastern municipios, Apaseo el Alto and Apaseo el Grande, are almost entirely agricultural, and the agriculture that is practiced there is primarily dryland farming. The other five municipios are generally irrigated in the lowlands, and produce good yields of all irrigated crops.

Both private and ejidal farming is important in the zone. Private farms owned 56.9 percent of the agricultural land in 1970, while the remainder was divided among the 1,284 ejidos. But the distribution of land among the private farms was very unequal: farms above 5 hectares, which were about half of all private farms, owned over 97 percent of the private land. Given that most ejidal plots are also small--usually between 4 and 8 hectares--there emerges an important division between the large private farms and the small farms, whether private or ejidal. Barbosa-Ramírez considers this division to be much more significant than the division between

TABLE 6-2
Labor Force by Sector: Bajío

<u>Municipio</u>	<u>Agriculture(%)</u>	<u>Industry(%)</u>	<u>Commerce (%)</u>	<u>Services (%)</u>	<u>Others (%)</u>	<u>Total (%)</u>
Apaseo el Alto	5897 (88.8)	256 (3.9)	244 (3.7)	149 (2.2)	93 (1.4)	6639 (100)
Apaseo el Grande	6229 (84.0)	451 (6.1)	281 (3.8)	324 (4.4)	134 (1.7)	7419 (100)
Celaya	15756 (49.0)	6157 (19.1)	4437 (13.8)	4492 (14.0)	1310 (4.1)	32152 (100)
Salamanca	13313 (61.8)	4876 (22.6)	1452 (6.7)	1530 (7.1)	357 (1.8)	21528 (100)
Jaral del Progreso	3492 (83.6)	213 (5.1)	198 (4.7)	200 (4.8)	74 (1.8)	4177 (100)
Cortazar	6124 (71.3)	994 (11.6)	707 (8.2)	525 (6.1)	243 (2.8)	8593 (100)
Villagrán	2676 (74.9)	177 (5.0)	214 (6.0)	468 (13.1)	36 (1.0)	3571 (100)
Total	5387 (63.6)	13124 (15.6)	7533 (9.0)	7688 (9.1)	2247 (2.7)	84079 (100)

Source: 1970 Censo de Población, México.

private and ejidal farms: "There exists (on small farms) only a legal difference between propietarios and ejidatarios, for both groups are equally affected by poverty and both severely limited with respect to access to product and factor markets and technological advance" (1973: 82).

2. FARM INCOME AND LABOR USE

2.1 Basic Characteristics

2.1.1 The Data Base

The data presented in this chapter were collected from a sample of 218 farms for the June 1973 to May 1974 agricultural cycle. The farms were chosen to correspond to those from a random sample survey by Castillo (1956) in 1954, in order to study the effects of technological change in the region upon agricultural incomes, inputs, yields, and particularly, employment over the 20-year period (a comparison with the 1954 data is now underway.).

The 1974 labor data are among the most detailed available for a large regional survey of Mexican agriculture. The number of days of household labor, hired labor, machinery use, and use of animal traction was collected for each of 27 labor activities and type of crop on every farm in the sample. Thus the basic unit of labor data appears, for example, as 6 days of family labor in the second weeding of corn, which occurred in the month of July. It was the observation of interviewers that these data were among the most reliable collected; farmers might not know exactly how many

kilos they grew or how much ammonium nitrate fertilizer they used, but they had a clear recollection of how long it took to do an activity.

All labor data are derived from aggregations of these basic units. Labor is aggregated by month, and broken down into strata of farm and family or hired. It is also aggregated by month and broken down by major crops. Any single figure, such as total household farm labor, is then a sum of these basic labor data. Any other method (except for direct observation of labor use on each farm over the year, which is extremely costly) could only lead to less reliable data. Such a method would depend upon an unbiased mental summation by the interviewee, whether of days by activities and crop over the month, activities and months by crop, or in the worst of cases, the summation of all labor activities in all crops over the year. At least in the Bajío, a query as to the amount of time worked in a year inevitably elicits the response, "Pues, trabajo todo el año" ("I work all year").

Off-farm labor was collected by month and occupation for all household members who worked on the farm during the year. For members who were absent the entire year, the amount of their remittances is added to total household income, but their labor is not included because there is no reliable source for this data.

If any data in the survey have an implicit bias, it is the income data. In general, income is probably understated on the larger farms because of the fear of the interviewee that the data

might be used for purposes other than academic research. The size of these holdings is also likely to be understated, because a large farmer might give data on a farm as if it were an independent unit, when in fact it might be worked with several other farms, with inputs and outputs combined. The phenomenon of renting was specifically addressed in the questionnaire, but the data are unlikely to capture its full extent because of the illegality of rental of ejidal farms.

The 218 farms are divided into 4 strata according to their size and the percent of land irrigated. Unirrigated farms are qualitatively different from irrigated farms with respect to the crops grown and farm labor patterns, and so farms with less than 25 percent of their area under irrigation are grouped into one strata. Farms with 25 percent or more of their land irrigated are grouped into 3 strata according to size; the first is 0 - 4.0 hectares, the second is 4.1 - 12.0 hectares, and the last is above 12 hectares. These are arbitrary divisions, designed to isolate factors affecting farm income and employment on the largest and smallest farms. Eighty-four of the farms are in the middle-irrigated category, the largest of the strata, and most of these are between 4 and 8 hectares. But in the Bajío, where land is good and water available for two crops, a farm of this size can produce a level of income adequate to support a family. Twenty large irrigated farms were surveyed, along with 42 small irrigated farms, 84 medium irrigated farms, and 72 unirrigated farms. These proportions may not

correspond exactly to the current pattern of land ownership in the seven municipios, but these strata do accurately reflect the major types of agriculture practiced in the Bajío, and no generalizations are made (nor are possible) in this heterogeneous zone without reference to the strata under consideration. This is a cumbersome stylistic procedure--instead of presenting one number for the value of agricultural capital, four will have to be shown--but it will become apparent that the differences among strata are great and that this inconvenience is necessary to understand the heterogeneity of the agricultural situation and the relationship between modes of agricultural production.

2.1.2. Farm Size and Tenure

Table 6-3 exhibits data on farm size, tenure, and incidence of land rental. About one-third of the farms in the sample are unirrigated. These farms are predominantly located along the rims of the valley or in the eastern part of the zone, which is not benefited by the Lerma irrigation district. Over half of these farms are private, and some are quite large.

On the large unirrigated farms it is a common practice in the zone to lease parcels of land on a yearly basis to other farmers or landless laborers in a sharecropping arrangement called mediería. Usually the owner will provide the land, and sometimes seeds and animals for traction, and the mediero will provide the labor. For this labor he receives about half of the value of production, often

in physical quantities of the product rather than money.

TABLE 6-3

Farm Size, Irrigation, and Tenure: Bajío

	Unirrigated (72 farms)	Small Irrigated (42 farms)	Medium Irrigated (84 farms)	Large Irrigated (20 farms)
Total farm size (ha.)	17.4	3.4	7.8	55.8
Cultivated area (ha.)	13.0	3.3	7.8	49.3
Irrigated area (ha.)	0	3.1	7.2	46.5
Extended farm size (ha.)	20.7	6.3	11.1	82.0
Incidence of <u>ejido</u> farms	44%	74%	93%	10%
Incidence of renting*	18%	12%	14%	5%

*Percentage of farms where the owner received less than half of the value of production.

While many of the unirrigated farms are private, the small and medium-size irrigated farms are mostly ejidal. These farms are usually located in an irrigation district which provides them water from a system of canals throughout the year. Thus almost all of this land is under cultivation, at least during one season of the year.

A significant percentage of these small and medium irrigated farms engaged in land rental (given the illegality of rental of ejidal lands, it must be assumed that the survey results under-

state the incidence of the phenomenon). Land rental differs from mediería because in the latter, the critical input (land) is provided by the landowner, while in the former the renter contributes substantial inputs which allow production of more remunerative crops. While the ejidatario may control fertile land and have assured an adequate supply of water, he often lacks the resources necessary to cultivate this land productively. The land is thus rented to a farmer with other landholdings who has the capital to complement the irrigation and soil quality of the ejidal plot. Castillo remarked in the mid-1950's, "Property in goods such as tractors, oxen, mules, and irrigation equipment thus tends to stimulate a centripetal force which absorbs the land of those who don't possess the inputs" (1956: 158). Most of the farmers acquiring land through rental are private, though some ejidos have members who have acquired tractors and increased the effective size of their landholdings through rental. Table 6-3 shows that the extended size of the average farm in each strata, which include the extra land worked, significantly exceeds the average size of the farm unit under study. Combined with the fact that only a few farms in each strata engaged in this practice, these data emphasize the importance of renting for land concentration in the zone.

2.1.3 Agricultural Capital and Technology

Differences among farm strata are even more obvious in the data on inputs of capital, shown in Table 6-4. The large irrigated

farms, with a total value of agricultural capital of \$357,827 pesos per farm, are clearly capitalist enterprises. They have more machinery and use more fertilizer and other purchased inputs per hectare than the other farms.

TABLE 6-4
Selected Capital Inputs: Bajío
(pesos)

	Unirrigated (72 farms)	Small Irrigated (42 farms)	Medium Irrigated (84 farms)	Large Irrigated (20 farms)
Fixed Capital	\$ 1924	\$ 2433	\$17106	\$107788
Machinery	11982	8028	20831	161482
Animals	<u>20636</u>	<u>10543</u>	<u>21329</u>	<u>88557</u>
Total	\$34542	\$21004	\$59266	\$357827
Machinery/ha.	\$ 888	\$ 2362	\$ 2407	\$ 4221
Fertilizer/ha.	78	687	1029	1328
Purchased inputs/ha.	<u>115</u>	<u>1025</u>	<u>1497</u>	<u>1721</u>
Total capital/ha.	\$ 4293	\$ 8123	\$ 7085	\$ 9285

However, the differences in the amount of capital per hectare among the irrigated farms are not great when compared to the low values exhibited by farms in the unirrigated strata and in other zones in this study. It appears that the irrigated farms employ a rather homogeneous technology, which includes the use of hybrid seeds, fertilizer, and machinery.

Most irrigated farms in the zone employ machinery in some activities. Even the small farms rent a tractor for the task of breaking the land, and the larger farms may use a combine for the harvest. Eighty percent of the small irrigated farms and 93 percent of the medium irrigated farms had introduced machinery technology in the last 20 years. Seventy percent of the large farms owned their tractors, while this figure dropped to 26 percent for the medium farms and much less for the small or unirrigated farms. Tractor ownership was much more economic for the large farms--the yearly cost per hectare cultivated was \$61 pesos for these farms compared to \$100 pesos for the medium-sized farms.

2.1.4 Crop Composition and Commercialization of Production

A wide variety of crops can be grown on the irrigated land in the Bajío, and most of these crops are destined for the market rather than home consumption. More farmers still plant corn more than any other crop because those with poor land, little money for fertilizer, or no means of machine harvest can obtain an adequate yield of the crop. However, sorghum has replaced corn as the most important commercial crop grown during the summer cycle. It is both more profitable and more easily cultivated and harvested with machine methods.

Corn or sorghum is planted in the spring after the soil has been prepared in late winter. The growing season extends through the summer, and the crops are harvested in the fall. On irrigated land,

TABLE 6-5
Crop Composition: Bajío
(hectares)

	Unirrigated		Small Irrigated		Medium Irrigated		Large Irrigated	
	(72 farms)	Per- centage Total	(42 farms)	Per- centage Total	(84 farms)	Per- centage Total	(20 farms)	Per- centage Total
Corn (irrigated)	0.2	(1.2)	0.9	(22.0)	1.6	(16.3)	6.5	(10.2)
Corn (unirrigated)	7.0	(45.2)	0.1	(2.4)	0.5	(5.1)	3.7	(5.8)
Sorghum	4.1	(26.5)	1.2	(29.3)	3.0	(30.6)	21.0	(32.9)
Wheat	--	(0.0)	0.6	(14.6)	2.0	(20.4)	16.3	(25.5)
Others	4.2	(27.1)	1.3	(31.7)	2.7	(27.6)	16.3	(25.4)
Total	15.5	(100.0)	4.1	(100.0)	9.8	(100.0)	63.8	(100.0)

a winter crop of wheat or oats is often planted. The Bajío was once known as the "granary of Mexico" and was a major wheat-growing region, but this position is now occupied by the large irrigation districts on the coasts of Sonora and Sinaloa. Other important crops in the zone are alfalfa, the primary feed of dairy cattle, and vegetables such as tomatoes, broccoli, onions, garlic, and chile peppers. All are high value crops, requiring intensive use of labor, fertilizer, and other inputs, and are grown primarily on the large irrigated farms.

Table 6-5 shows that the average farm in each irrigated strata has more land in sorghum than in any other single crop. Only the unirrigated farms still have corn as their major crop, and among the irrigated farms, the percentage of land in corn decreases as farms increase in size. The relative importance of wheat increases in the larger farms, and all strata of irrigated farms have a rather diversified mix of crops.

The gross value of production and the amount of purchased inputs per hectare are shown for the major crops in Table 6-6. Sorghum and wheat are generally more productive and require more purchased inputs than corn. The similarity in the value of purchased input for each crop across irrigated strata (except for the large irrigated strata, in which the value of purchased machinery is not allocated to each crop) emphasizes that there is a homogeneous technology employed in crop production on all irrigated farms. Moreover,

comparison of purchased inputs in corn on the irrigated farms of the Bajío with those in Valsequillo shows that these inputs are only slightly lower in that zone (\$1,015 pesos/ha.), indicating a similar corn technology in both zones. However, while the average farm in Valsequillo sold only 37 percent of their corn production, Table 6-6 shows that almost all corn in the Bajío is marketed.

TABLE 6-6

Value of Production and Purchased Inputs per Hectare: Bajío

	Unirrigated (72 farms)	Small Irrigated (42 farms)	Medium Irrigated (84 farms)	Large Irrigated (20 farms)
<u>Value of Production/ha. (pesos):</u>				
Corn	\$1259	\$2682	\$2696	\$6510
Sorghum	5910	4160	4604	7316
Wheat	--	6166	5047	5039
<u>Purchased inputs/ha. (pesos):</u>				
Corn	462	1204	1461	757
Sorghum	862	1762	2104	1115
Wheat	--	1780	2242	1145
Percentage of Corn Sold	84	95	87	98
Percentage of Land in Subsistence Crops	74	30	29	22

The index of "subsistence" crop composition in the Bajío, the ratio of the land in corn, beans, and chickpeas to land in all crops, shows these crops to absorb only 30 percent of the land

planted in the small irrigated strata, declining to 22 percent in the large irrigated strata, while farms in the unirrigated strata have an average of 74 percent of their land in these crops. This comparison demonstrates the importance of irrigation to crop composition, a major variable influencing patterns of labor use.

A multiple regression of the percent of land in subsistence crops (COMCRPS) on land size (SUPLAB), percent of land irrigated (PCTREG), the number of household members over 16 years of age (NUM16), and the amount of capital per hectare excluding animals (KLRATIO) gives the following results:

$$\text{COMCRPS} = .716 + .383 \text{ SUPLAB} - .475 \text{ PCTREG} + .756 \text{ NUM16} - .965 \text{ KLRATIO}$$

significance	(.701)	(.001)	(.362)	(.006)
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elasticity	(.011)	(-.683)	(.095)	(-.075)
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$$R^2 = .34 \quad F = 27.17 \text{ (significance} = .001\text{)}$$

The two variables which are independently significant in the relationship are the amount of irrigated land and the amount of capital per hectare; as capital increases and more land is irrigated, less land is put in the subsistence crops. Land size has little effect upon this index, and the size of the household labor force is not a significant variable. Agricultural capital, in the form of irrigation and machinery, therefore plays the dominant role in determining crop composition, confirming an important relationship

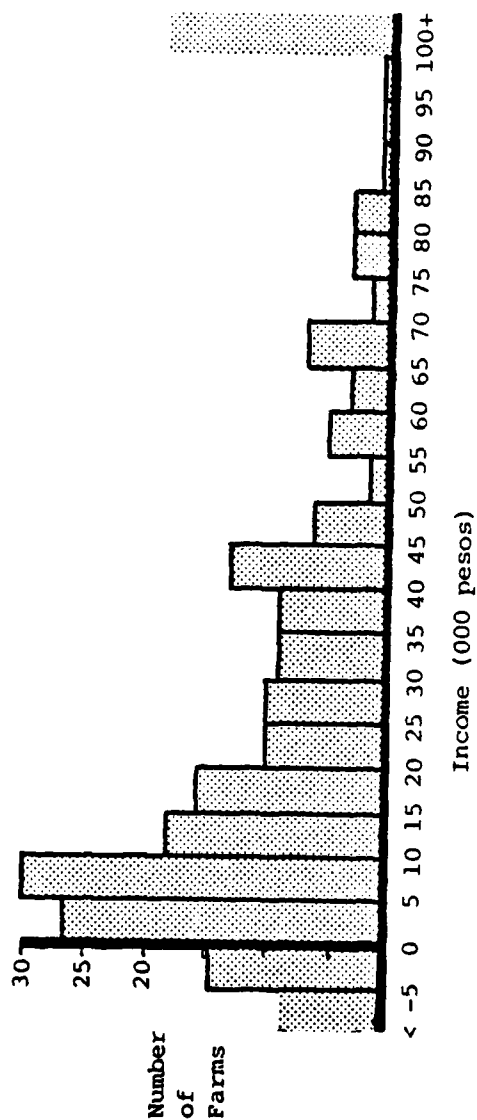
developed in Chapter II.

All of these statistics point to a major characteristic of agriculture in the Bajío--that production is highly integrated into the market economy. Sorghum has replaced corn as the major grain crop, although this makes more farms dependent upon acquiring this staple in the market and purchased agricultural inputs. The primary reasons for this shift in crop composition are that sorghum is both more productive with modern technology than corn and it requires a much lower level of labor inputs. Many tasks, particularly the harvest, are mechanized, which aids to explain why larger farms put more of their land into this crop.

These data show that there are essentially two agricultural technologies employed in the Bajío--that used on unirrigated and unproductive land, and that used on irrigated land and some unirrigated land in the level valley. The former technology employs animals for traction, seeds from the previous harvest, and a low level of fertilization, while the latter employs tractors and combines, hybrid seeds, and a complement of fertilizers, pesticides, and herbicides. These farms have undergone a rapid process of technological change since the 1954 survey (Castillo, 1956). It remains to be seen what effect this change has had upon agricultural income and employment.

Figure 6-1 shows a frequency distribution of monetary farm income for the 218 farms in the sample (this statistic does not include charges for the depreciation of capital, which reduces net

FIGURE 6-1
Distribution of Farm Income: Bajio



incomes on the large irrigated farms by about 7 percent). Farm incomes are concentrated in the lower ranges, with most farms exhibiting incomes from \$5,000 to \$10,000 pesos. But fewer than one-quarter of the farms in the Bajío earned incomes of less than \$5,000 pesos, while 64 percent of the farms in Valsequillo and 79 percent of the farms in the Mixteca Baja earned less than this amount. In addition, almost half of the farms in the Bajío earned more than \$20,000 pesos in farm income.

Table 6-7 shows farm income, farm income per hectare, farm income per day of family labor, and net income in corn production per day of family labor by strata. The unirrigated farms have the lowest income, and income correlates strongly with farm size on the irrigated farms. The smallest irrigated farms earned more per hectare than the larger farms, indicating a more intensive use of their land. Analysis of income per day worked will be postponed to the next section.

TABLE 6-7
Selected Farm Income Variables: Bajío
(pesos/farm)

	Unirrigated (72 farms)	Small Irrigated (42 farms)	Medium Irrigated (84 farms)	Large Irrigated (20 farms)
Farm Income	\$6830	\$21282	\$36082	\$319059
Farm Income/Ha.	579	8801	4552	6812
Farm Income/Day Household Labor*	157	889	309	495
Net Corn Production/ Day Household Labor*	116	189	788	2208

*Excludes cases with negative farm income or net value of corn production.

A path analysis of the factors posited in Chapter II to determine farm income is presented in Figure 6-2. A variable for "effective land size" is substituted for actual land size, which is a multiple of actual size by a factor representing the percent irrigated to capture the higher productivity of irrigated land. The path analysis demonstrates two important points: the direct contribution of land size and quality is less than in any other zones; and capital plays a much more important role in determining farm income in the Bajío than in other zones, positively affecting income directly, and also indirectly through its effect on crop composition. All of the relationships between these key variables exhibit the signs predicted confirming the validity of this segment of the labor allocation model. These variables explained 56 percent of the variance in farm income in the sample.

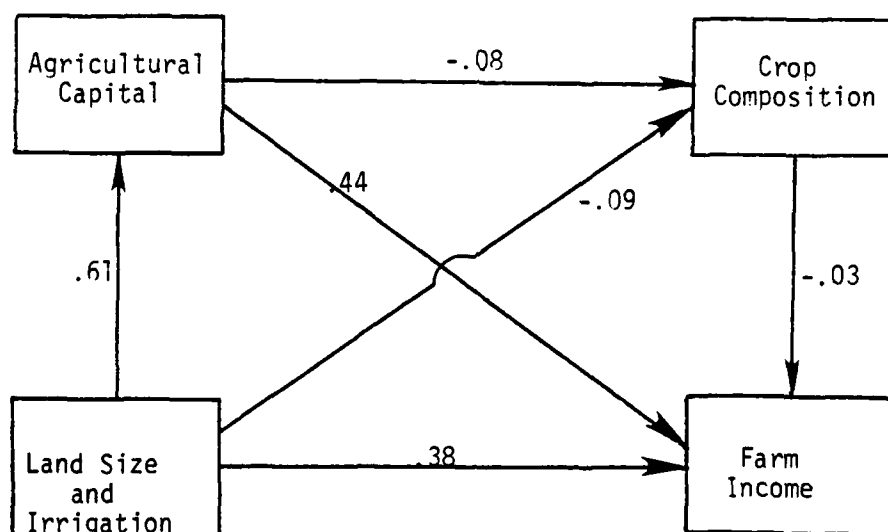
Farm income per hectare (YFARMH) is influenced by land under cultivation (SUPLAB), the percentage irrigated (PCTREG), the value of capital per hectare (KLRATIO), the value of purchased inputs per hectare (VLNPTH), total labor per hectare (DTTPDH), crop composition (COMCRPS), and the location of the farm, which captures the fertility of the land under cultivation. A multiple regression in these variables (with the dummy variables representing the municipio in which the farm is located omitted from the equation) is shown below:

YFARMH = municipio dummy - 5.10 SUPLAB = 7932 PCTREG + 27.7 DTTPDH
 significance (.894) (.002) (.461)
 elasticity (-.015) (1.15) (.158)

+ .243 KLRATIO + 6539 COMCRPS + .803 VLNPTH
 (.065) (.016) (.348)
 (.192) (.664) (.183)

$R^2 = .11$ $F = 2.17$ (significance = .015)

Figure 6-2
 Path Analysis Farm Income: Bajío



The percentage of land irrigated, the value of capital per hectare, and crop composition are the only significant variables when considered independently, although the high degree of correlation between many of the independent variables makes the overall

F-statistic, with a significance of .015, more meaningful. Land size exerts a small negative influence, indicating that economies of scale are not important except through the influence of land size on capital.

In concluding this section, a simple and important fact emerges: farm incomes in the Bajío are significantly higher than in the other regions because modern techniques are used on good irrigated land, permitting the production of high-value crops. But these benefits are not spread equally among all farm households, for not all land is irrigated and there is a much larger degree of land concentration in the zone. While the smaller irrigated farms of the Bajío earn incomes which are higher than those earned by the majority of farms in the other zones, the income of the large farms is almost ten times that of the medium-sized farms. Thus the distribution of farm income in the Bajío is much more unequal.

The higher farm incomes of the small- and medium-sized irrigated farms, when compared to those in other zones, is the direct result of their higher degree of integration with the regional commercial economy. To cultivate profitable crops, heavy reliance is made upon purchased inputs, and the majority of production is sold. The farmer growing sorghum or wheat is committed to the market economy for fertilizer, machinery, and labor; for a market for the crop; and for most of the necessities of household consumption. Our interviews were conducted during a year of

adequate rainfall, no early frosts and few losses due to insects or diseases. But conditions are not always so favorable, and even a partial crop loss can mean a large monetary loss when the costs of production are high. Moreover, there may be no corn production to provide relief from further dependence on the marketplace in case of a crop failure. Certainly this motive was important in determining that some corn was grown in 50 percent of the small irrigated farms and 56 percent of the medium irrigated farms, despite its lower profit potential.

2.3 Farm Labor

2.3.1 Household and Hired Farm Labor

Table 6-8 presents aggregate data on farm labor use in the Bajío that is comparable to data analyzed in the preceding chapters. At this level of aggregation, several important aspects of farm labor utilization emerge. Total labor use increases as the farms become larger, but on a per hectare basis the largest farms use less labor than the smaller farms. All farms use a significant amount of hired labor, with even the smallest irrigated farms hiring over half of their labor on the average (medieros, commonly used to replace hired labor on the unirrigated farms, are not included as hired labor). Labor inputs per hectare are by far the lowest of all the zones studied, averaging 22 days in the Bajío versus 37 days in versus 37 days in Valsequillo, 75 days in Las Huastecas, and 118 days in the Mixteca Baja. In addition, household farm labor inputs

are low even on the larger farms, because most of the increase in labor inputs on these farms is contributed by hired labor.

TABLE 6-8
Household and Hired Farm Labor: Bajío
(days/farm)

	Unirrigated (72 farms)	Small Irrigated (42 farms)	Medium Irrigated (84 farms)	Large Irrigated (20 farms)
Household Labor	116	38	85	33
Hired Labor	<u>91</u>	<u>43</u>	<u>102</u>	<u>726</u>
Total Farm Labor	207	81	187	759
Household Labor/Ha.	17	14	12	2
Hired Labor/Ha.	<u>5</u>	<u>12</u>	<u>13</u>	<u>13</u>
Total Labor/Ha.	22	26	25	15
Hired/Total Farm Labor	.31	.52	.50	.84

In the Bajío, the disaggregation of these labor data permit an investigation of their component parts, the seasonal distribution of labor and the labor requirements of different crops. Figures 6-3 (a) through (d) present the monthly distribution of household and hired farm labor for each of the four farm strata. The data represented in these figures is the total of crop labor inputs, labor inputs in other forms of agricultural production, such as dairy cattle, and inputs in the maintenance of farm infrastructure. Labor in the latter two categories is spread more evenly throughout the year than labor in corn production, so it is not surprising that

small irrigated farms have the most even distribution of total labor over the year. Hired labor on these farms is mainly used for the spring planting (contributed by the operator of rental machinery), the summer weeding, and the late fall period of harvest and planting of a winter crop. During the slack months, little labor is hired. These small farms generate more than ten days of total employment for only two months of the year.

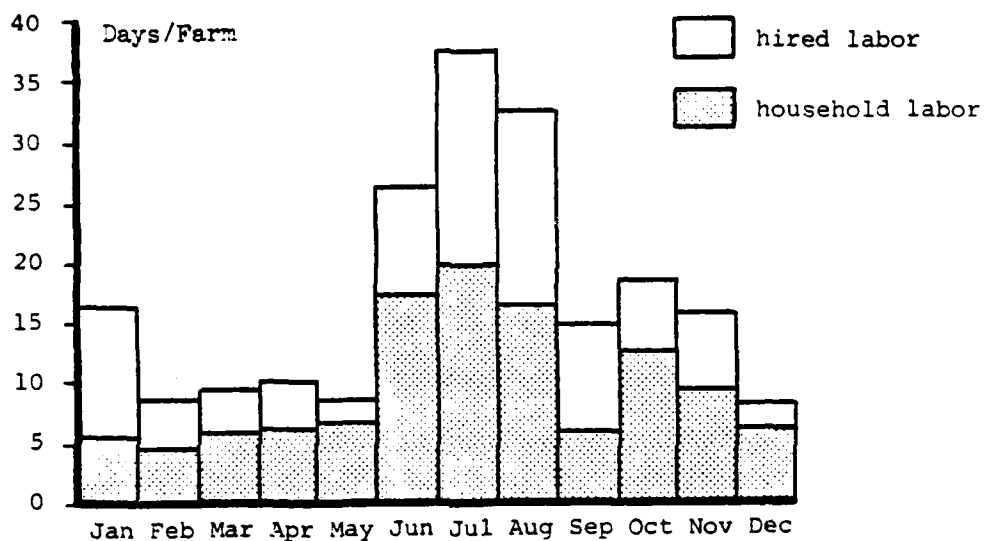
The medium-sized irrigated farms, in contrast, employ wage labor in all months, despite the fact that household labor inputs in June exceed total labor inputs in all but three months. There are two possible explanations for the fact that the household hires labor in months when it could provide these labor inputs internally: household labor might be employed in more remunerative off-farm activities during the slack months, while during the peak labor months hired laborers are more difficult to find; and household and hired labor are not perfect substitutes for all tasks. Hired labor corresponds partly to machine operations, while much of the increased household labor inputs during the summer is employed in weeding, in which the entire household can participate.

The primary source of hired labor in the zone does not consist of flows of surplus labor from the small to the large farms. Ninety-three percent of the farms indicated that the majority of jornalero labor was applied by landless laborers. Despite the high seasonality of hired labor use, there did not appear to be any serious seasonal labor shortages. Even farmers in

FIGURE 6-3

Household and hired Farm Labor by Month: Bajío

a) Unirrigated Farms



b) Irrigated Farms, 0-4 hectares

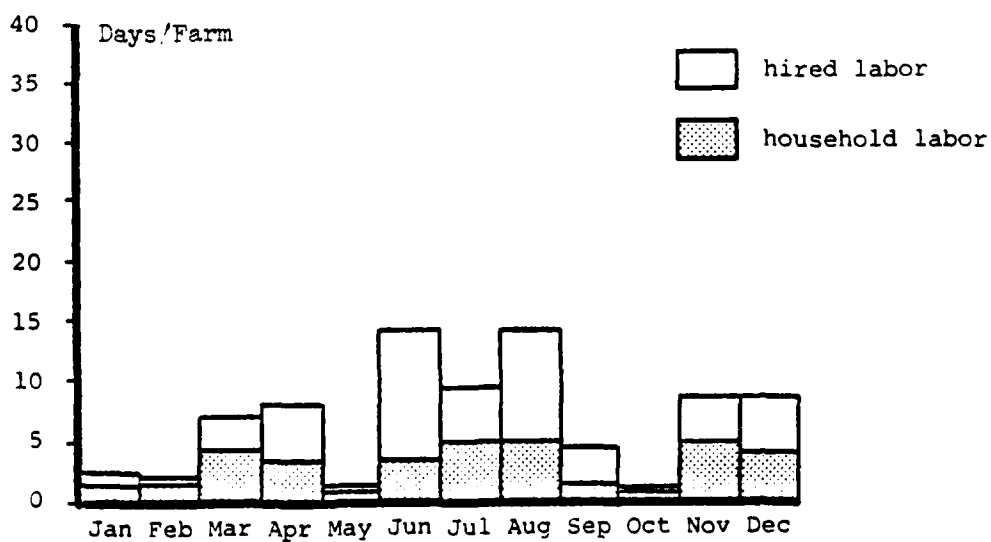
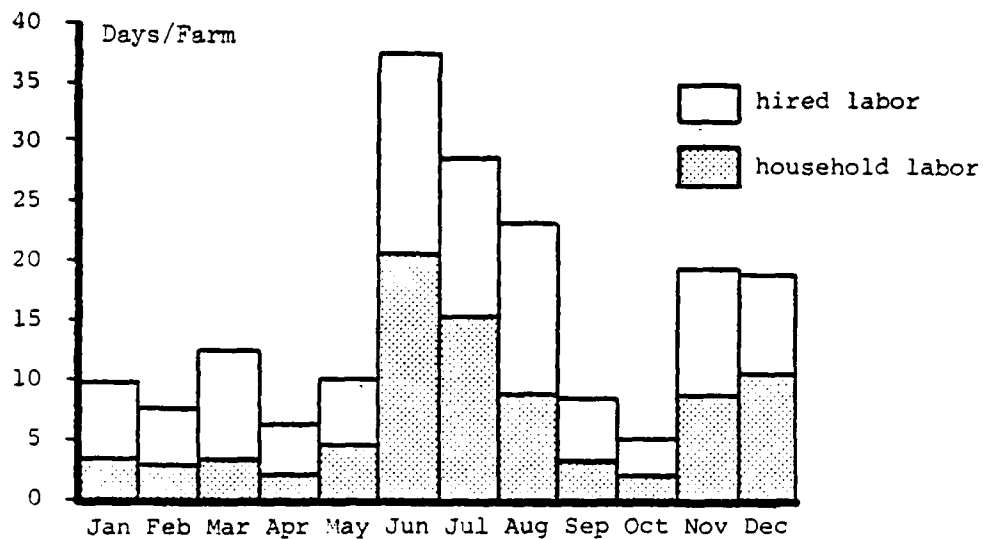
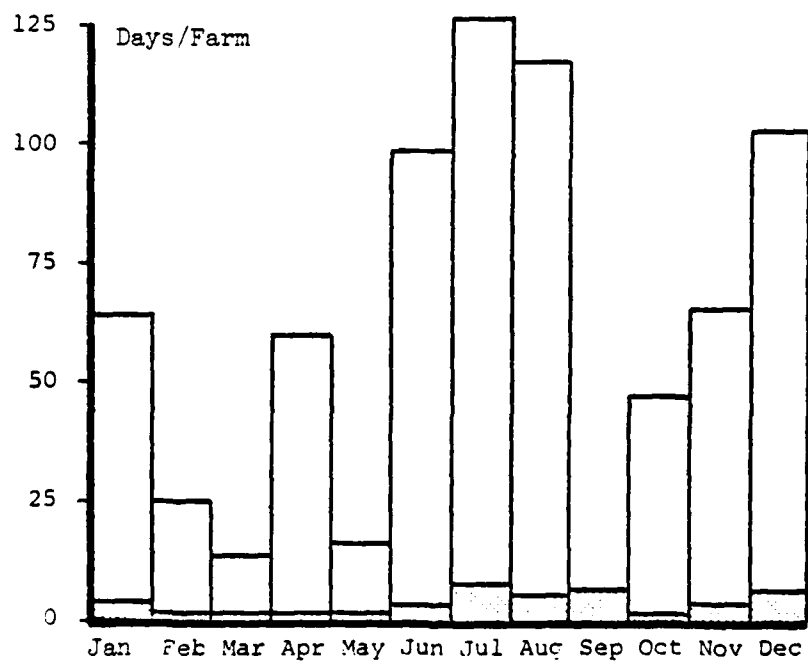


FIGURE 6-3 (continued)

c) Irrigated Farms, 4-12 hectares



d) Irrigated Farms, above 12 hectares



the strata of large irrigated farms responded that they did not encounter difficulty in finding workers during labor-intensive months, and the average monthly wage rate remained constant at about \$25 pesos over the year. If no shortages are encountered in peak months, this would indicate a large surplus supply of labor during slack months. This has important implications for circular migration from the region.

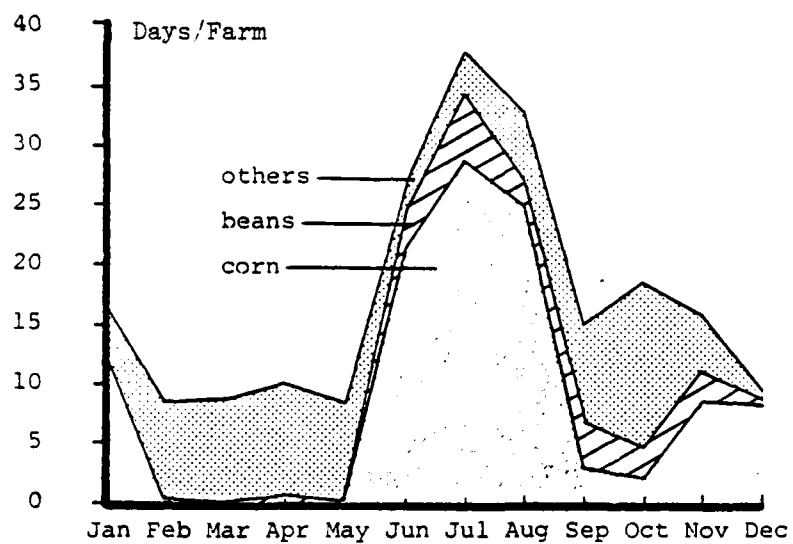
2.3.2 Monthly Farm Labor by Crop

Figures 6-4 (a) through (d) show the monthly farm labor inputs by crop for each of the four farm strata. Corn exhibits the most marked differences in monthly labor use of any crop, and is the major contributor to seasonal differences in total labor use on all but the large irrigated farms. This is especially true on the unirrigated farms, which cannot vary their composition of crops to spread labor inputs more evenly over the year.

The period of intensive labor in sorghum corresponds with that of corn except for the harvest, because sorghum is harvested with a combine. This clearly shows that sorghum is a substitute for corn with respect to its demands upon the major agricultural inputs, land and labor. Other crops, however, could be characterized as complements to corn and sorghum, for their labor use is more intensive during the slack periods in these crops. Thus cultivation of these crops tends to level the total distribution of labor over the year. This fact illustrates the importance of crop composition

FIGURE 6-4
Monthly Labor Inputs by Crop: Bajío

a) Unirrigated Farms



b) Irrigated Farms, 0-4 hectares

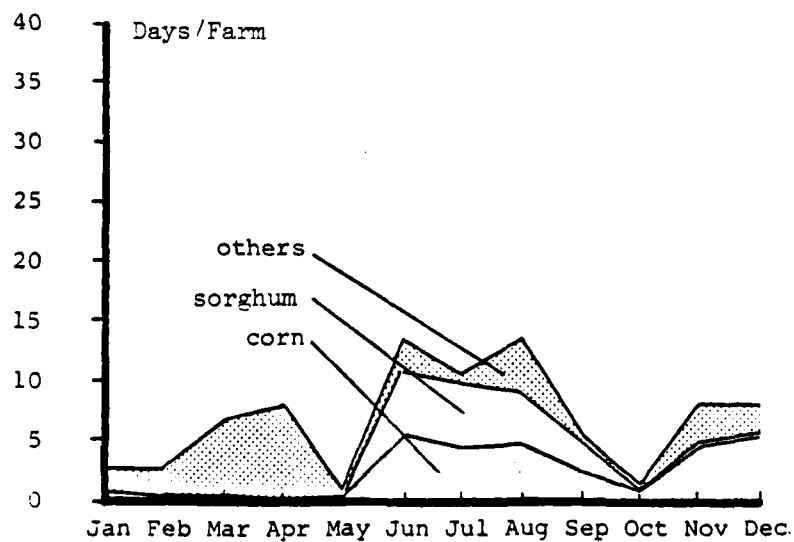
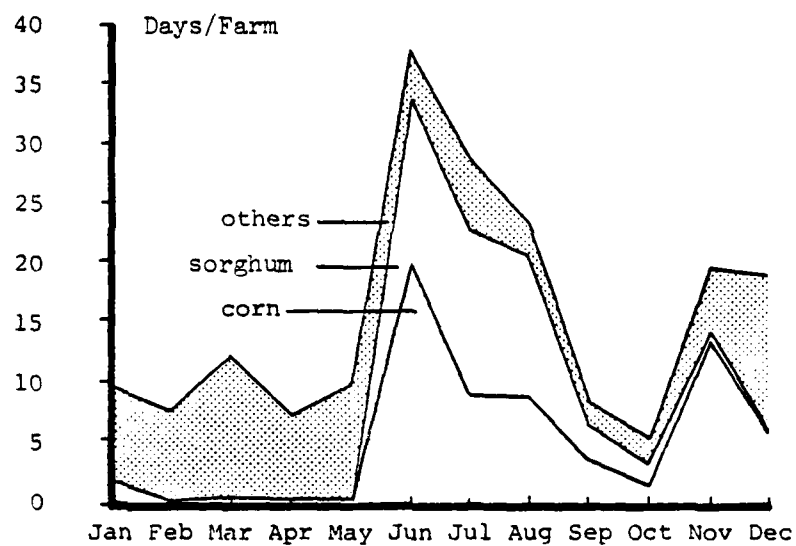
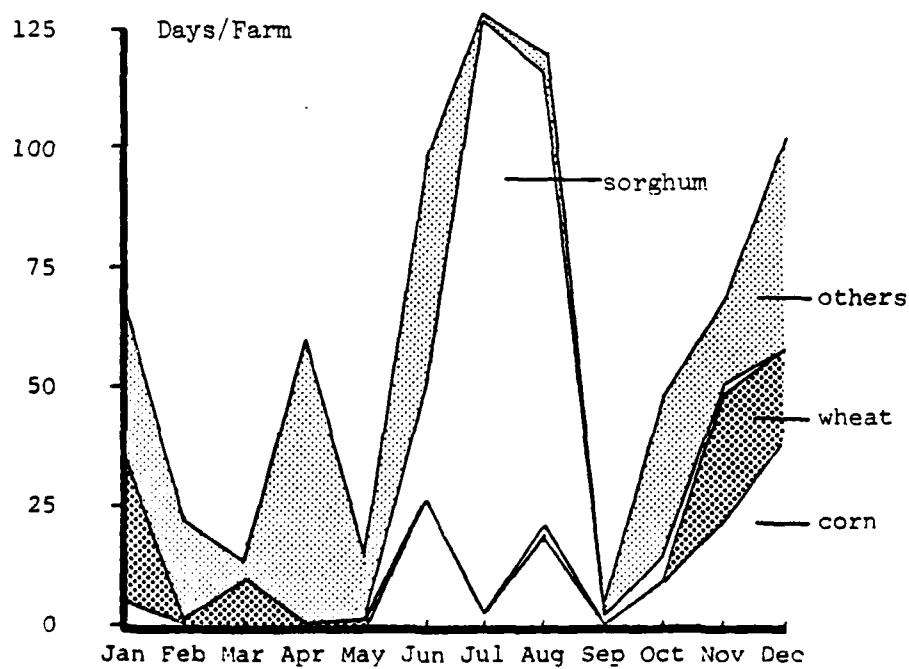


FIGURE 6-4 (continued)

c) Irrigated Farms, 4-12 hectares



d) Irrigated Farms, above 12 hectares



in the overall household labor allocation model. Planting crops with non-coincident labor demands allows the household to increase its labor inputs over the year, and to decrease the proportion of total labor which is hired.

For the large irrigated farms, manipulating crop composition may allow greater utilization of owned agricultural machinery, thereby reducing its amortized cost per day or per hectare. This has provided an additional impetus for the substitution of sorghum for corn. Corn is a crop which is more difficult to mechanize than sorghum. Even the large irrigated farms use only about 5 days of machinery per year in corn, versus 18 days in wheat and 16 days in sorghum. Thus the decision to purchase a tractor or combine for the winter crop, wheat, may imply substituting sorghum for corn as the summer crop. Under these conditions, the "threshold" farm size for purchase of tractor not only is a function of the relative costs of tractors and labor, but changes with the relative profitability of the machinery-intensive versus labor-intensive crop. This hypothesis is supported by data on amortized tractor cost per hectare cultivated, which was \$125 pesos on the 8 unirrigated farms with tractors versus only \$61 pesos on the 14 large irrigated farms with tractors.

On the average, sorghum required 21 days of labor per hectare, wheat only 10 days, while corn used 38 days per hectare. The shift in crop composition in the Bajío has therefore had a negative effect upon agricultural employment in the zone. If the

relative inputs of household and hired labor are separated, this change in crop composition has predominantly led to a decline in household labor inputs. Household labor in the medium strata of irrigated farms was 30 days per hectare in corn compared to only 9 days in sorghum, while hired labor inputs were 21 and 14 days respectively. Thus the shift from corn to sorghum has also lowered the demand for hired labor, affecting employment in the class of landless laborers, while increasing the supply of household labor for employment in other activities.

2.3.3. Farm Labor Relationships

The data above indicate that household farm labor depends primarily upon the composition of crops on the farm. A multiple regression analysis of family on-farm labor (FAMONL) on crop composition (COMCRPS), land size (SUPLAB), the percentage of land irrigated (PCTREG), the value of machinery (INVMAQ) and the number of family workers 16 years old or more (NUM16) gives the following results:

$$\begin{aligned}
 \text{FAMONL} &= 33.5 - 164 \text{ SUPLAB} - 22.1 \text{ PCTREG} + 10.7 \text{ NUM16} \\
 \text{significance} &\quad (.641) \quad (.232) \quad (.006) \\
 \text{elasticity} &\quad (-.025) \quad (-.169) \quad (.386) \\
 & - .348 \text{ INVMAQ} + 77.0 \text{ COMCRPS} \\
 &\quad (.738) \quad (.001) \\
 &\quad (-.012) \quad (.409)
 \end{aligned}$$

$$R^2 = .16 \quad F = 7.97 \text{ (significance} = .001\text{)}$$

Crop composition, as expected, exerts a positive and significant influence upon total household labor per farm, with more land in corn increasing household farm labor. The size of the family labor force is also positively and significantly related to household farm labor, but household labor does not increase with land size or the percentage irrigated. While this result may seem surprising if reference is made to the other zones where land size was an important determinant of household farm labor, previous analysis shows that the larger farms in the Bajío put more land into sorghum, requiring less family labor. Moreover, the principal irrigated crop, wheat, uses very little labor. This comparison emphasizes the importance of a regional analysis which makes explicit the actual conditions of production in each zone.

The ratio of hired to total farm labor (HIRFAM) is hypothesized in Chapter II to be a function of total farm labor (TOTONL), crop composition (COMCRPS), which captures the differences in labor seasonality among crops, farm income (YFARM), the size of the household labor force (NUM16), and household off-farm labor (TOTOFFL). A multiple regression on these variables is shown below.

All variables with the exception of off-farm labor exhibited the predicted sign and are statistically significant at the .02 level or greater. A greater percentage of labor is hired as total labor increases, as the percentage of land in corn declines, as farm income increases, thereby providing a source for payment of wages,

and as the size of household labor force increases. Thus it appears that farm conditions, rather than the opportunity for off-farm labor, are more important in determining the percentage of hired farm labor.

$$\begin{array}{l} \text{HIRFAM} = .720 + .111 \text{ TOTONL} - .504 \text{ TOTOFFL} - .276 \text{ COMCRPS} \\ \text{significance} \quad (.019) \quad (.778) \quad (.001) \\ \text{elasticity} \quad (.058) \quad (-.011) \quad (-.253) \end{array}$$

$$\begin{array}{l} -.574 \text{ NUM16} + .390 \text{ YFARM} \\ (.001) \quad (.009) \\ (-.360) \quad (.040) \end{array}$$

$$R^2 = .26 \quad F = 14.63 \text{ (significance} = .001\text{)}$$

3. OFF-FARM INCOME AND LABOR

The income earned from wage labor was a significant portion of household income for all but the large irrigated strata of farms. Two-thirds of the households in the sample engaged in off-farm labor, and Table 6-9 shows that for these households, off-farm income was between 25.7 and 43.5 percent of total income.

Table 6-9 also shows that remittances were important to households in the unirrigated strata and the small and medium strata of irrigated farms. Over one-fourth of the households in these strata received income from persons who did not work on the farm during the year (and so whose labor and income was not included in off-farm income and labor), averaging \$5,936 pesos for each of these households.

TABLE 6-9
Household Income by Source: Bajío

	Unirrigated (72 farms)	Small Irrigated (42 farms)	Medium Irrigated (84 farms)	Large Irrigated (20 farms)
Farm Income	\$6830	\$21282	\$36082	\$319059
Off-Farm Income	9386	6879	11552	20512
Remittances	1299	2136	1705	--
Total Household Income	\$17515	\$30297	\$49339	\$339571
Average Percent Total Income Off-Farm:				
All Farms	26.1	29.0	17.5	7.2
Farms with Positive Off-Farm Income	39.9	43.5	25.7	28.6

Table 6-10 shows the allocation of household labor to on- and off-farm activities. Even by this definition, which excludes the labor of those members who did not work on-farm at all, all strata of households worked a significant amount off-farm. Jornalero labor was more important on the unirrigated and smaller irrigated farms, but its importance relative to other occupations was far less in the Bajío than in other zones. The Bajío therefore exhibits a more diversified occupational composition of off-farm labor. Households in the large irrigated farms worked a great deal off-farm, for many of these households include members who hold full-time positions as professionals or in commercial enterprises, in addition to supervising farm production.

TABLE 6-10

Farm and Off-Farm Household Labor: Bajío
(days/household)

	Unirrigated (72 farms)	Small Irrigated (42 farms)	Medium Irrigated (84 farms)	Large Irrigated (20 farms)
Farm Labor	116	38	85	33
Off-Farm Labor	<u>100</u>	<u>110</u>	<u>90</u>	<u>132</u>
Total Household Labor	216	148	175	265
Household Wage Labor	50	64	56	32
Off-Farm/Total Labor	.18	.33	.21	.15
<u>Jornalero</u> /Off-Farm Labor	.29	.25	.15	--

Perhaps the most striking characteristic of household labor in the Bajío is its low absolute total for all strata. Total labor for all strata in the Bajío averaged only 183 days per household, compared to 331 days in Valsequillo, 414 days in Las Huastecas, and 259 days in the Mixteca Baja. Households in the two indigenous zones worked more on-farm than in the Bajío, while those in Valsequillo worked more off-farm. Certainly the higher incomes from farm production in the Bajío were instrumental in reducing the necessity for off-farm income, but the fact that two-thirds of the households in the Bajío engaged in off-farm labor indicates that farm income was not sufficient for most households in the zone. The seasonal coincidence of labor demand by the large farms with that of the small farms, due to the relatively equal composition of crops

across irrigated strata, might also have effectively limited the participation of small farms in agricultural wage labor.

The seasonality of off-farm labor, which can also be accurately derived from the Bajío data, reveals its variations with respect to variations in on-farm labor. If off-farm labor were to vary inversely with farm labor, this would indicate that the household subordinated its off-farm activities to farm labor demands.

Figure 6-5 (a) through (d) shows monthly variations in farm labor, off-farm labor, and total household labor for the four strata of farms in the Bajío. Off-farm labor does not vary much by month in any of the four strata, so that most of the variation in total monthly household labor is due to farm labor demands. Thus off-farm labor plays an independent role in total household labor allocation; households work a rather constant amount of time off-farm during each month, and during months of high farm labor inputs, they hire labor to enable them to continue working in these activities.

The occupational composition of off-farm labor strongly conditions the opportunity for the household to vary its monthly labor inputs in these activities. Most off-farm labor is in non-agricultural waged occupations or in small-scale commercial activities, requiring constant labor-inputs for the duration of the work. The demand for jornalero labor, on the other hand, does not come during periods of slack labor demand on the small farm. The larger farms are able to fill their labor requirements during peak periods without relying upon labor from the peasant landholders; 93 percent

FIGURE 6-5
Monthly On- and Off-Farm Household Labor
(days/household)

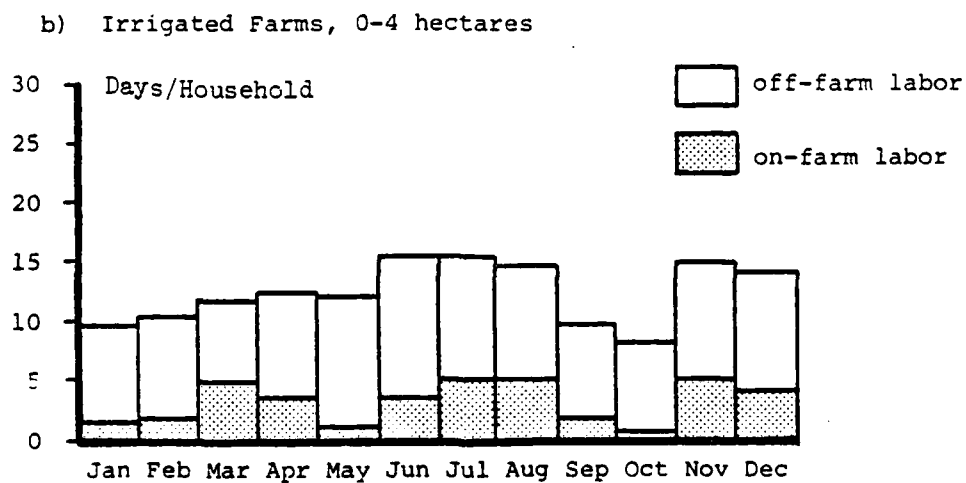
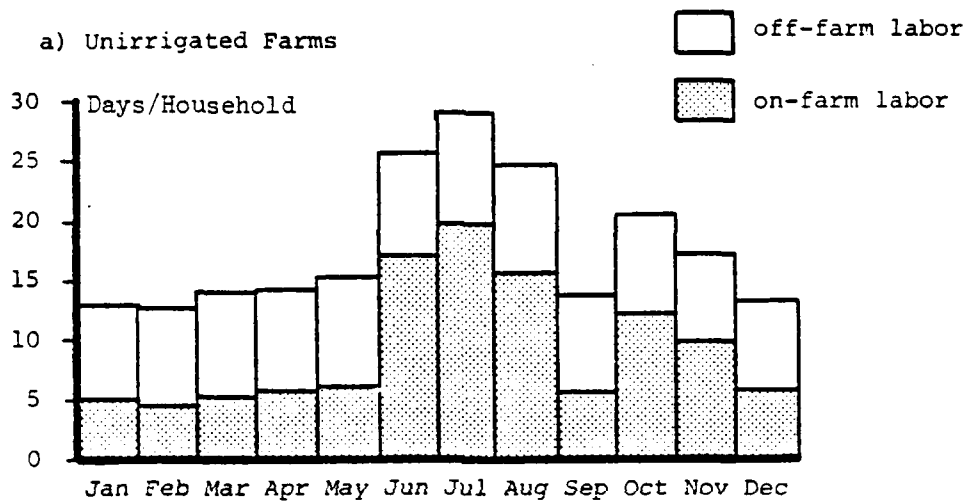
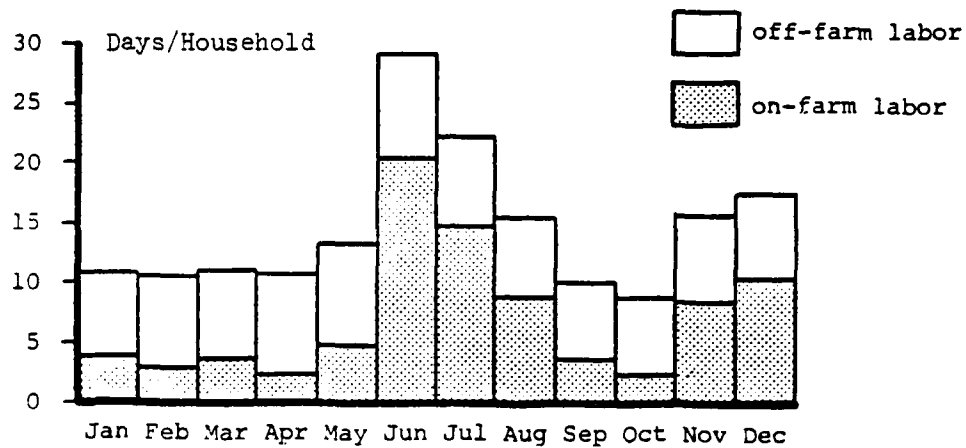
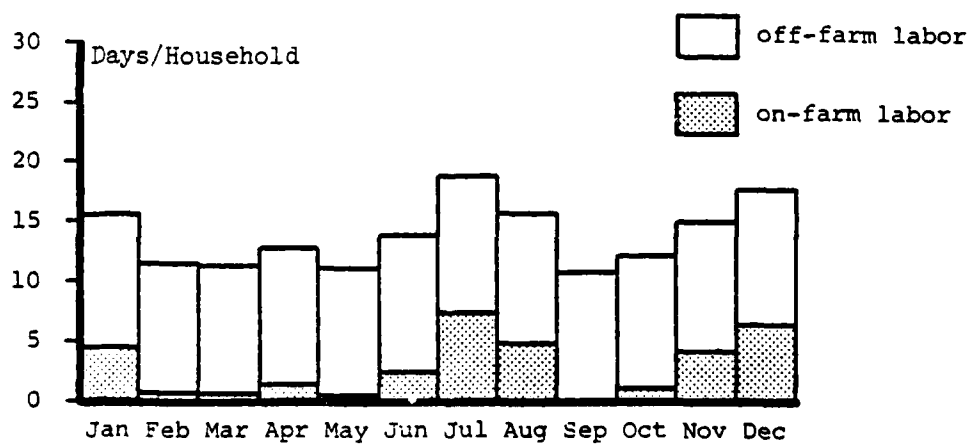


Figure 6-5 (continued)

c) Irrigated Farms, 4-12 hectares



d) Irrigated Farms, above 12 hectares



of the farms said that the majority of their hired labor was provided by landless workers.

A regression of the number of days of off-farm wage labor (DFMFUW) for those farms which engaged in wage labor confirms the significance of the factors outlined in the labor allocation model. The size of the household labor force (NUM16) and the number of dependents per household member of working age (DEPRAT) are each positively and significantly related to the dependent variable, while the number of days of household labor on-farm (DFMPDT) varies negatively with off-farm wage labor. Of the variables predicted to influence wage-labor, only farm income (YFARM) does not have a significant effect. The exclusion of farms entirely dependent upon farm income from the regression negates much of the effect of this variable, but the lack of a relationship for the wage-labor farms is still an interesting result not observed in the other zones. The seven municipios were entered as dummy variables into the regression in a step-wise fashion, and their combined effect upon the relationship was also statistically significant. This result indicates the importance of the local availability of wage-labor opportunities.

DFMFUW =	<u>municipio</u>	dummies	+	33.38	NUM16	-	.298	DFMPDT
significance				(.006)	(.003)		(.006)	
elasticity		--			(.602)		(-.144)	

+	.001	YFARM	+	14.50	DEPRAT
	(.219)			(.035)	
	(.025)			(.235)	

$R^2 = .33$ $F = 2.84$ (significance = .006)

Regression is a useful technique for determining the relative influence of factors affecting a single dependent variable. However, the question which is posed in the household labor allocation model concerns the factors affecting the choice of different patterns of labor allocation, each of which includes a combination of on-farm labor and different types of off-farm labor.

To investigate the major patterns of labor allocation by farm households in the Bajío, and the factors which distinguish among households exhibiting these patterns, a different set of statistical techniques has been used. First, a cluster analysis of household labor patterns was undertaken in order to form groups of households with similar patterns of labor allocation. Then a factor analysis of the total set of variables hypothesized to affect household labor patterns was used to group variables which were highly correlated into a single factor, resulting in a reduced number of factors which were relatively independent. Finally, this set of factors was applied in a discriminate analysis of the clusters derived in the first step. The statistical significance of the discriminate analysis is both a test of the power of the factors to distinguish among the clusters, and of the arbitrariness of the clusters which were formed.

Households were clustered on the basis of four types of household employment: (1) household farm labor; (2) off-farm jornalero labor; (3) other types of off-farm wage labor and petty commerce (comerciante pequeño); and (4) off-farm labor in the United States,

although the labor section of the questionnaire from which this data was derived from does not include persons who did not contribute farm labor inputs during the year, and thereby excludes some of the households which receive remittances from the U.S. Before the cluster analysis was run, households for which the sum of all types of wage labor and household farm labor did not exceed one-third of their total employment were excluded. The major source of employment for these households would be supervision of hired labor (only farmers in the large irrigated strata of farms did not participate in farm labor), commerce on a large scale (comerciante grande), and employment in a professional position, such as a lawyer. The exclusion of this group (n=43) follows the theoretical focus of the labor allocation model upon the peasant mode of production and off-farm labor in waged occupations.

The groups formed by the cluster analysis are composed of households with similar patterns of labor allocation. A cluster analysis determines the underlying taxonomic structure of a group of items on the basis of some predetermined criteria. For instance, it can be used to group animals into species or sub-species on the basis of specified characteristics. Groups are formed by maximizing the similarity of items within groups and minimizing the similarity between groups. There is no test of the "significance" of the structure which emerges within the analysis itself, but if the groups which are formed make sense, the factors which affect the

characteristics on which the groups were formed should be able to predict group membership. This will be the purpose of the discriminate analysis.

Households were clustered into three groups using a program developed by Uebersax (1978). The first (the wage-labor group) included a spectrum of households from those which worked entirely off-farm in "other" wage-labor occupations to those which mixed their wage-labor proportionally with farm labor (n=26). The second (the diversified-labor group) included households which engaged in a diversified pattern of farm labor, off-farm jornalero labor, and U.S. labor (n=26). The largest group (the agricultural-labor group) was composed of households which worked entirely on-farm to mostly on-farm plus some jornalero labor (n=123). The grouping of farms with wage-labor in the United States with the diversified-labor group is itself an interesting result of the cluster analysis. This group worked more off-farm than the farm-labor group, but did not specialize in non-agricultural types of wage-labor as did the wage-labor group.

A factor analysis (by principal components solution) of variables that represent some aspects of the major determinants of labor allocation was undertaken to eliminate redundancy among the variables. This procedure creates several factors, each of which is a linear combination of the original variables. The "factor loadings" indicate the relative importance of the variables in each factor.

The 5 factors that were created from the original 10 variables together explained 80 percent of the variance in these variables. The first factor (farm wealth) was predominantly defined by farm size, income, and agricultural capital; the second (intensity of cultivation) by percent of land irrigated, crop composition, and the value of purchased inputs per hectare; the third (household composition) by the household labor force and dependent ratio; the fourth by education; and the fifth by the percentage of hired to total farm labor. The groupings of variables into these factors has strong intuitive appeal, and corresponds to the farm and household variables developed in the labor allocation model of Chapter II.

Finally, these factors and a set of dummy variables, representing location of the household by municipio to capture the influence of wage-labor opportunities, were combined into a set of functions which best discriminate between the groups defined by the cluster analysis. A discriminate analysis derives one or more linear combinations of the predictor variables which maximizes the distance between groups and minimizes the distance between households in each group. If the factors developed do not discriminate well between the groups, either the groupings obtained by the cluster analysis are not meaningful, or the factors hypothesized to determine group membership are not the correct ones. Therefore, the discriminate analysis is a type of test of the applicability of the model of labor allocation to the Bajío data; it tests both the concept of discreetly different patterns of household labor, and the

relevance of the variables hypothesized to determine these patterns. Moreover, the relative contribution of each discriminate function to the total variance in the discriminating variables indicates the relative importance of the function. The maximum number of discriminate functions is one less than the number of groups, so there are three potentially significant functions in this analysis. These functions, their coefficients for each of the factors and municipios, and relevant statistical tests are shown in Table 6-11.

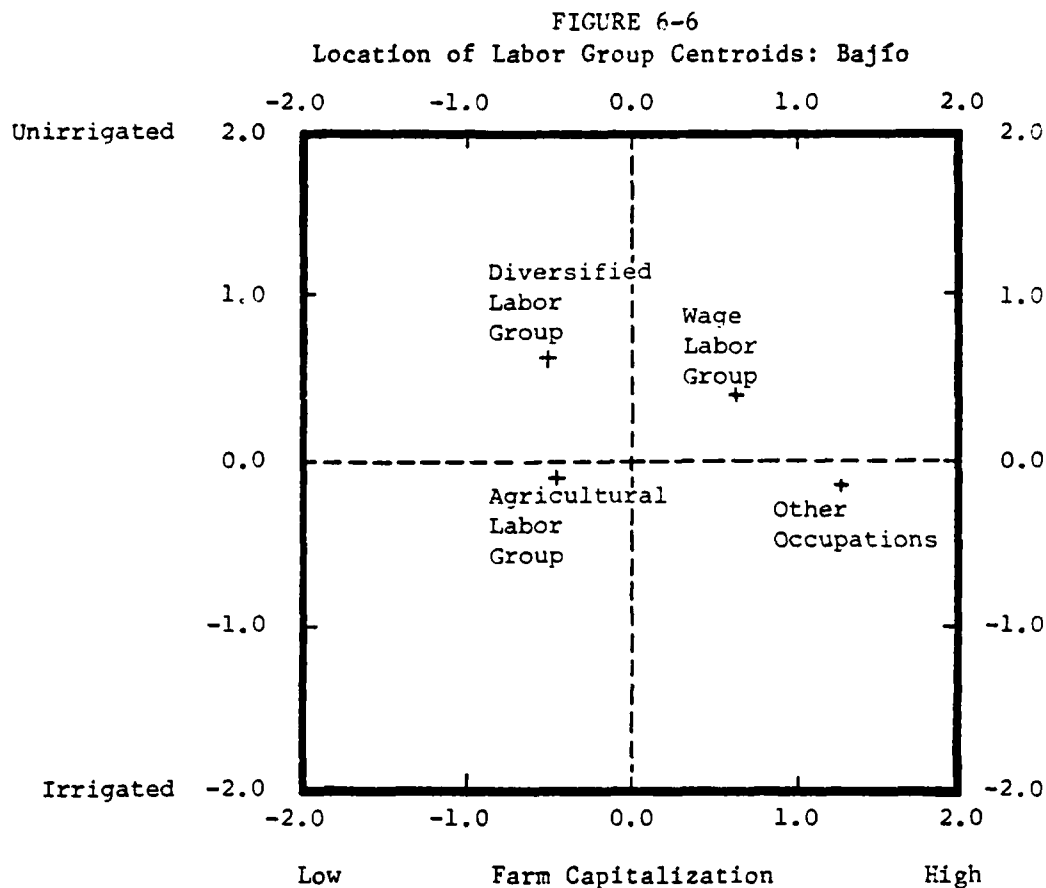
TABLE 6-11

Discriminate Analysis Functions for Household
Labor Patterns: Bajío

Standardized Coefficients:	Function 1 "Farm Capitalization"	Function 2 "Location"	Function 3 "Household"
Factor 1--Farm Wealth	.503*	-.352	-.238
Factor 2--Intensity of Cultivation	.665*	.264	.519
Factor 3--Household Composition	.013	.265	-.558*
Factor 4--Education	.383	-.127	.522*
Factor 5--Hired/Total Farm Labor	.886*	.051	-.208
Municipio Dummy 1	-.312	.073	.296
Municipio Dummy 2	-.623	.251	-.085
Municipio Dummy 3	-.643	.408*	.219
Municipio Dummy 4	-.788	-.570*	-.150
Municipio Dummy 5	-.622	-.429*	.076
Municipio Dummy 6	-.572	-.230	-.125
<u>Statistics</u>			
Eigenvalue	.535	-.085	.035
Percent of Trace	81.6	13.0	5.4
Chi-Square	114.08	24.36	7.27
Significance	.001	.227	.609

Of the three discriminate functions which were formed, the first explained 81.6 percent of the total variance in the discriminating factors, and was statistically significant at the .001 level. The coefficient of the variables in the function, which are analogous to the beta weights in a multiple regression, can be used to "name" the function just as the coefficient on variables in a factor analysis can be used to "name" the factor. The first function was most heavily weighed by the factors representing farm wealth, intensity of cultivation, and the percentage of hired farm labor (the factors with asterisks). Location also had relatively high weights, for the above three factors are dependent upon fertility and irrigation. Therefore, this function can be named "farm capitalization", representing the intensity of capitalist production on the farm. The second function loads most heavily on the municipio dummies, with a positive value on the municipios in unirrigated, low-density populated areas, and a negative value on the irrigated, western municipios. This function was much less important than farm capitalization. The third function, which explains only 5.4 percent of the variance, was most heavily influenced by factors reflecting household composition (the higher the value the greater the number of dependents per adult member and the smaller the male labor force) and education, and hence can be termed the "household" function.

Figure 6-6 shows a plotting of the group centroids from the farm labor groups along the first and second discriminate functions,



where these centroids are the most typical location of a household in the space defined by these functions. The farm-capitalization function that defines the horizontal axis discriminates between the agricultural-labor group plus the diversified-labor group and the other two groups. The farms which had more aspects of the capitalist mode of production tended to allocate household labor to non-agricultural occupations, both wage-labor and professional, with the "other occupations" (professional, comerciante grande)

concentrated on the farms which scored very high on this function. The other axis discriminates between farms which worked more off-farm in wage labor (the wage-labor group and the diversified-labor group) and those which work predominately on-farm or in "other" occupations. This axis corresponds to the location on the farm, with the eastern unirrigated municipios separated from the western irrigated municipios. Thus this function discriminates between farm regions with a relatively high and even distribution of farm labor (the irrigated regions) and those with a more uneven demand for farm labor, freeing household members for wage-labor when the demand for agricultural labor on other farms in the area is also low. Thus members in these households tend to work in a variety of wage-labor activities.

In conclusion of this section, there have emerged four distinct patterns of household wage-labor allocation in this sample of farms in the Bajío. The intensity of capitalist production on the farm was the most important factor discriminating between these groups. The group which worked in agricultural labor and diversified labor ranked lowest on the scale of the intensity of capitalist production. Households which ranked high on the farm-capitalization scale tended to devote their off-farm labor to non-agricultural and professional activities. It appears that farms with wage labor in the United States, included in the diversified-labor group, do not differ significantly from farms allocating their labor to agricultural activities with respect to the intensity of capitalist

production. Both groups of farms are relatively poor compared to farms with high capital intensity.

4. MIGRATION

The survey instrument used in the Bajío was designed to capture patterns of on-farm and off-farm employment in different crops and strata of farms. For the purpose of studying circular migration, and particularly that to the United States, the data possesses both strengths and weaknesses. The major weakness is that monthly data on off-farm labor by activity is not coded for the location of that labor, so that circular migration cannot be distinguished from local employment. The primary strength is that migration to the United States is captured by three different methods: (1) one of the activity codes for monthly off-farm labor was U.S. labor; (2) a general question on the location of jornalero labor was asked; and (3) the location of each member of the household at the time of the interview was determined, including in the definition of household members all persons who lived with the household head or contributed money or labor to the household. These data capture different components of the same phenomena, the first and second primarily circular migration, while the last includes permanent migration.

Table 6-12 shows the location of household members at the time of the interview by strata of farm. Only males of working age are included in these data. The table reveals that while the

TABLE 6-12
The Location of Household Members: Bajío
(number of persons)

Place	Unirrigated (72 households) (%)	Small Irrigated (42 households) (%)	Medium Irrigated (84 households) (%)	Large Irrigated (20 households) (%)
Same Dwelling as Household Head	122 (60.3)	74 (63.8)	161 (64.4)	32 (60.4)
Same Village as Household Head	48 (23.6)	22 (18.9)	60 (24.0)	12 (22.6)
Celaya or Salamanca	14 (6.9)	6 (5.2)	16 (6.4)	8 (15.1)
Mexico City	4 (2.0)	9 (7.8)	5 (2.0)	0 (0.0)
United States	15 (7.4)	5 (4.3)	8 (3.2)	1 (1.9)
Total	203 (100.0)	116 (100.0)	250 (100.0)	53 (100.0)

majority of household members lived with the household head, about 40 percent of the males of working age lived in another dwelling or were absent at the time of the interview. This demonstrates the importance of the extended household as the relevant unit of data collection for the study of labor allocation. Most of the men living in the same community were probably not themselves landowners, but were sons of the landholder and shared in the labor and income of the farm. The theoretical distinction between landholder and landless laborers cannot be applied to these persons, and just as they have been included within the farm household on this study, a study of landless laborers would have to consider their labor contributions to the extended household and their returns from this labor. Such a study would be extremely valuable, for it could determine the role of these contributions and returns in a strategy of risk minimization by the landless laborer, which might be instrumental in his remaining in the community or region.

These data indicate that a significant number of males were in the local cities of Salamanca and Celaya, in Mexico City, or in the United States at the time of the interview. These men could be either seasonal or permanent migrants, but they had to send remittances or help in farm labor to be included in this section of the questionnaire. More men were in the United States than were in Mexico City, which is only about three hours from Celaya by bus. Thus the United States is an important destination for migrants from the survey area.

TABLE 6-13
The Location of Jornalero Labor: Bajío
(total days)

	Unirrigated (72 households) (%)	Small Irrigated (42 households) (%)	Medium Irrigated (84 households) (%)	Large Irrigated (20 households) (%)
Same Municipio:				
Private Land	3056 (47.7)	1041 (31.0)	2128 (34.7)	365 (100.0)
Ejidal Land	1048 (16.4)	1394 (41.5)	1565 (25.5)	--
Guanajuato	917 (14.3)	--	439 (7.2)	--
Mexico	108 (1.7)	--	--	--
United States	1277 (19.9)	926 (27.5)	1995 (32.6)	--
Total	6406 (100.0)	3361 (100.0)	6127 (100.0)	365 (100.0)

Survey respondents were asked to approximate the number of days worked as a jornalero (agricultural laborer) during the year in different places. This data captures the jornalero labor of all household members, but because of the approximate nature of the absolute figures, the number of days in Table 6-13 should be regarded as relative frequencies. Most jornaleros are employed within the same municipio, and except for households in the small irrigated strata, more of this time is worked on private farms than on ejidal farms. What is significant in these data is that the United States is the next most frequent destination, exceeding the total of labor in other parts of Guanajuato and Mexico. Moreover, this only includes U.S. agricultural labor; of the estimated 31 households in the sample with laborers in the United States, 18 engaged in agricultural labor, leaving 42 percent employed in other activities. Wage-labor in the United States is therefore the most common type of circular migration for households in the Bajío.

Table 6-14 presents data on the difference between farms which had household members who worked in the United States by any of the three definitions and those which did not. The large irrigated farms are excluded from this comparison, because they would strongly distort the data of the households which did not engage in U.S. wage labor. The most notable aspect of these data is that the two groups are not significantly different with respect to major economic variables affecting the household; farm size, farm income, purchased inputs per hectare, off-farm income, or off-farm

TABLE 6-14
Mean Values of Selected Variables for U.S. and
Non-U.S. Households: Bajío

	Households with U.S. labor (30 farms)	Households without U.S. labor (168 farms)*	Level of Signi- ficance of Dif- ference in Mean Values**
Farm Size (Ha.)	8.4	10.7	.586
Farm Income (pesos)	\$21131	\$22515	.936
Value of Capi- tal/Ha. (pesos)	\$10289	\$ 5576	.034
Value Purchased Inputs/Ha. (pesos)	\$ 1409	\$ 1923	.590
Off-Farm Income (pesos)	\$10138	\$ 9708	.935
Remittances (pesos)	\$ 4173	\$ 1198	.001
Off-Farm Wage Labor (days)	75	52	.245
Male Labor Force (persons)	4.1	2.8	.001
Education (years)	9.1	8.7	.810

*Excludes the large irrigated farms.

**T-test of pooled variance.

labor. Education was also approximately equal for the two groups, while remittances were significantly higher for households which had engaged in U.S. migration. However, of great interest is the comparison of the number of males 16 years or more; households which worked in the U.S. had an average labor force which was 46.4 percent

higher than those which did not, a difference which was statistically significant at the .001 level. To send a household member to the United States, the size of the household labor force must be adequate enough to provide farm labor inputs and other supportive services in the migrant's absence. The overall riskiness of household income is also reduced by having members available for a variety of other labor activities.

5. CONCLUSIONS

Reserving comparison of the Bajío and the other zones to the final chapter, the major relationships exhibited in the Bajío data can be summarized by reference to the flow model of household labor allocation shown in Figure 2-4. Capitalism is fully developed in the irrigated lowlands, while unirrigated farms continue to use a traditional technology. All irrigated farms use a technology that employs purchased inputs and mechanization, but the large farms control the majority of capital, renting it to the small farms. Even fertilizer and seeds are often obtained from the large farmers of a district, either directly or through commercial enterprises which they control, and these enterprises purchase much of the production of the small farms. By a purely technological definition, small irrigated farms in the Bajío would be a part of the capitalist mode of production, but the fact that they do not control the means of production separates them from the large farms.

The division between modes of production is blurred by these technological similarities, but is also maintained by differences in

means and patterns of labor allocation. The large irrigated farms plant less corn, which is the labor intensive crop, and have lower labor inputs per hectare. More farms have incomes in the \$5,000 - \$10,000 pesos range than any other, but more heavily capitalized farms earn higher incomes. Agricultural capital is an important determinant of farm income.

Labor inputs are low because of the crops grown and the mechanized technology which is employed, and these inputs are distributed very unequally through the year. For this reason, crop composition has a major influence upon the percentage of farm labor that is hired, as does the size of the household labor force. As predicted, off-farm wage labor is determined by family on-farm labor and household size and composition. Moreover, the discriminate analysis shows that farm income plays the major role in separating households which work off-farm in wage-labor occupations and those which do not. However, within this wage labor group, farm income is not a major variable determining the amount of off-farm labor.

Households which engage in U.S. migration are not significantly different than other households on small farms with respect to major farm variables. Apparently, U.S. migration is neither positively nor negatively selective of households in the peasant mode of the Bajío. However, the size of the household labor force was significantly larger for households engaging in U.S. migration. This evidence, combined with the clustering of households with U.S.

migrants along with those households that had a more diversified mix of on-farm labor and types of off-farm labor, indicates that U.S. migration is chosen as part of a mixed portfolio of farm and off-farm labor activities, which reduces the effect of the higher risk associated with U.S. wage labor.

CHAPTER VII

SUMMARY AND CONCLUSIONS

1. A COMPARISON OF THE FOUR AREAS

The four areas included in this study differ in many respects, and it is impossible to repeat all of the data upon which the conclusions in this chapter are based. However, the basic characteristics of farm income, household labor, and migration will be summarized and integrated with the model of regional labor allocation developed and applied throughout this study. The conclusions drawn from this analysis have important implications for theory and public policy, and the reader is encouraged to critically evaluate these conclusions using the entire set of data presented in the preceding four chapters and his or her own perspective and experience.

Table 7-1 presents some of the more basic data concerning farm capitalization and household income and labor in the four zones. The most important differences to emerge among the zones are analyzed below.

1. The Bajío has by far the highest farm income of any of the four zones studied. Although large farms in that zone and in Valsequillo inflate average farm income, income on the small and medium-size irrigated farms in the Bajío is also comparatively high. In Valsequillo, the distribution of farm income is especially unequal, and most farms are poor. In Las Huastecas, the relatively

high level of farm income is more significant for the majority of farms in that zone because incomes are more equally distributed. Only about one-fifth of the farms in the Bajío and Las Huastecas produced incomes of less than \$5,000 pesos, whereas the majority of farms in Valsequillo and the Mixteca Baja produced such low farm incomes.

TABLE 7-1

Selected Farm and Household Variables From
the Four Zones

<u>Farm Capitalization</u>	<u>Bajío</u>	<u>Valsequillo</u>	<u>Las Huastecas</u>	<u>Mixteca Baja</u>
Value capital/hectare (pesos)	\$6565	\$1798	\$ 285	\$ 907
Percentage of corn sold	88%	37%	14%	16%
Farms producing less than \$5000 pesos income	23%	64%	20%	79%
Total labor/hectare (days)	22	37	75	118
<u>Household Size, Income and Labor:</u>				
Household size	8.0	5.9	6.5	5.3
Adult household members	5.4	3.7	3.3	3.2
Total household income (pesos)	\$61787	\$33780	\$21027	\$4968
Farm income	49530	21487	16816	2639
Off-farm income	12257	12293	4211	2329
Total Household Labor (days):	183	331	414	259
Farm labor	82	78	275	171
Off-farm labor	101	253	139	88
Percentage of off-farm wage labor as <u>jornalero</u>	23%	63%	100%	72%

2. The Bajío and Valsequillo have the highest degree of capitalist penetration, both in agriculture and in the commercial and industrial sectors. Agricultural techniques in these two zones employ machinery, fertilizer, hybrid seeds, and irrigation, and more production is marketed than in the other two zones. Partly as a result of this higher degree of capitalization, farm labor per hectare in the Bajío and Valsequillo is much lower.

3. Off-farm income is high in both the Bajío and Valsequillo and is the major component of total household income for most farms in Valsequillo. In addition, a larger percentage of households in these zones work off-farm than in the two indigenous zones, Las Huastecas and the Mixteca Baja.

4. Household farm labor inputs are much larger in Las Huastecas and the Mixteca Baja than in the capital-intensive zones. Hired labor is used in all zones, so that it appears that capital and purchased inputs substitute for household labor in the Bajío and Valsequillo. As a consequence of this, off-farm labor is greater than household farm labor in these areas. However, in Las Huastecas and Valsequillo households with lower levels of farm income worked more off-farm, while in the Bajío and the Mixteca Baja the relationship between farm income and the percentage of off-farm household labor is not significant. Levels of farm income in the Mixteca Baja are so low that off-farm labor is undertaken whenever it is available; in the Bajío farm incomes are high and labor inputs low, so that farm and off-farm labor are not direct substitutes.

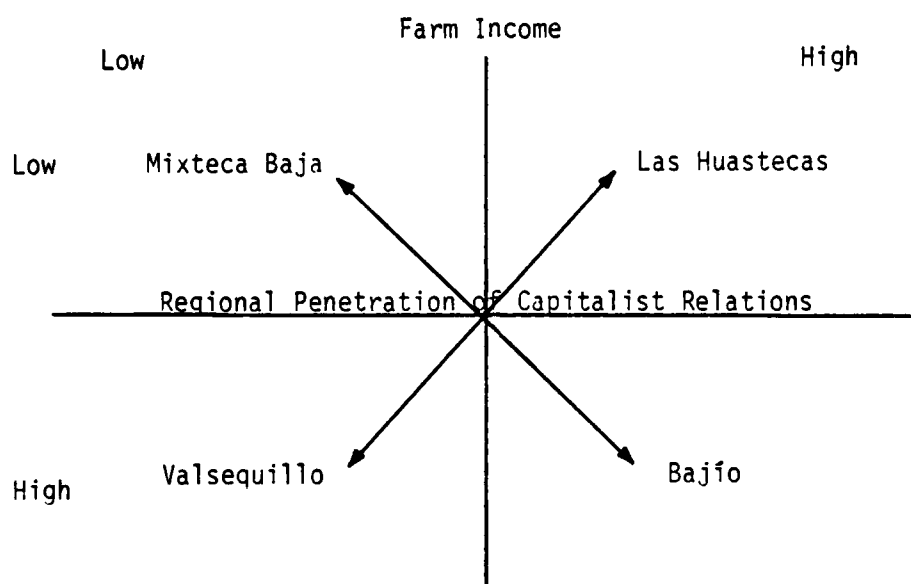
5. Households in the Bajío devote a lower percentage of their off-farm labor to agricultural day labor and engage in a wider variety of spatial patterns of labor allocation. Particularly important for the purposes of this study, only households in the Bajío engage in United States migration. The majority of off-farm wage labor for households in the other zones is local and agricultural, although the Mixteca Baja contributes a relatively large number of permanent migrants to selected Mexican cities.

6. Households in the Bajío are both larger and more mature than in the other zones. This increased size and maturity is due to the incorporation of more adult members into the extended family. Moreover, household size is the only variable distinguishing between households of U.S. migrants and non-U.S. migrants, the former being significantly larger and incorporating more males of working age.

Figure 7-1 presents a simple graphical representation of the position of the four zones on the basis of two highly important criteria, farm income and the regional penetration of capitalist relations. The Mixteca Baja and Las Huastecas are predominantly indigenous zones, using low levels of capital inputs and large amounts of labor in agricultural production. There are few local opportunities for off-farm wage labor outside of agriculture, and the zones are isolated from the urban commercial economy. Most corn produced is for home consumption.

Figure 7-1

Fundamental Differences Between the Four Zones



The Bajío and Valsequillo, on the other hand, are much more "developed" by conventional standards. Both zones include thriving commercial centers, and there is a wider variety of opportunities for work off the farm. Agricultural production is mechanized, and particularly in the Bajío modern technology and high-value commercial crops dominate. Per-hectare farm labor inputs are low, and off-farm wage labor by the household exceeds their farm labor. All off-farm labor is wage labor, whereas in the two indigenous zones community service and household non-wage labor exchanges are common. In both the Bajío and Valsequillo farm size

and the distribution of agricultural capital and farm incomes are highly unequal.

On the farm income scale, the Bajío and Las Huastecas are differentiated from Valsequillo and the Mixteca Baja. The Mixteca Baja clearly has the lowest farm income of any zone, and the high incomes on the few large farms in Valsequillo distort the fact that average farm income is only \$4,180 pesos for the farms which earned at least one-quarter of their household income off-farm, comprising 71 percent of all the farms. Although farm income is very unequally distributed in the Bajío also, even the small irrigated farms earn relatively high income compared to these two zones. In Las Huastecas, high household labor inputs and few expenditures on purchased inputs combine with a favorable climate permitting a variety of crops. Farm income is a larger percentage of total household income than in any other zone.

Within the dimensions defined by Figure 7-1, the major differences in the location of off-farm labor are between region groups located on the diagonals: Las Huastecas and Valsequillo on one diagonal and the Bajío and the Mixteca Baja on the other. In both Las Huastecas and Valsequillo, off-farm labor is predominantly local. Households in the Bajío and the Mixteca Baja, on the other hand, engage in more migratory activity, the former in circular migration, and the latter in permanent migration.

2. CONCLUSIONS

Three major conclusions may be drawn from the differences in patterns of household labor allocation among the four zones and between those households in the Bajío engaging in U.S. migration and those which do not. These conclusions support the focus of the labor allocation model on the degree of penetration of capitalist relations and on the household as the appropriate unit of analysis. The basic conclusions that emerge are highly interrelated:

1. The penetration of capitalist relations in agriculture decreases farm labor inputs substantially, by changing the composition of crops and by mechanization of many activities. It also increases the amount of household wage labor, both because households have more available time and because of increased dependence upon purchased commodities for consumption and agricultural production.

The agricultural laborer with no ties to the land suffers the most from the decreased demand for agricultural labor. Farmers with land receive a high value for their crops and so doubly benefit through a reduction in their labor inputs and higher returns. The landless laborer receives such compensation only if he is incorporated into an extended household with ties to the land. If not, he suffers long periods of unemployment dictated

by the highly seasonal labor demands of the medium and large farms.

2. The type of off-farm wage labor which predominates in a zone depends upon farm income and its relationship with household size, upon off-farm opportunities, and upon cultural factors of the region. In the Mixteca Baja, farm income is insufficient for the bare necessities of a small household and, with few local opportunities for wage labor, young people often migrate permanently to cities in which networks of relationships with people from the area exist. In Las Huastecas, farm production yields a relatively high income but requires heavy inputs of household labor, which leaves little opportunity for extended stays away from the farm. Farm incomes are generally low in Valsequillo, requiring a lot of off-farm labor to earn an adequate level of household income. While in Valsequillo this off-farm labor is predominantly in local agriculture, in the Bajío, which is similar in many other ways, off-farm labor more often is non-agricultural and involves circular migration, including migration to the U.S. What explains the difference?

The large size of households in the Bajío, and especially of those U.S. migrants within that zone, are central to the differences in patterns of labor alloca-

tion between the two zones. It may be postulated that households in the Bajío are larger because farm income is higher, permitting more members to share in the income from farm production. The incorporation of adult members into the extended household, combined with low farm labor requirements, allows one or more household members to work almost entirely off-farm. Provided the security of the extended household and a share in farm production, household members can leave the community for extended periods of time. Overall household income is increased by contributions of these household members, and the added security of the large extended household permitted by higher farm incomes permits these relatively more risky off-farm alternatives to be chosen. In Valsequillo, farm incomes are low and there are fewer adult members in each household, so that the failure to obtain a job in a more distant location could have serious consequences. Also, agricultural labor provides a relatively secure source of income in that zone. This hypothesis is supported by the discriminate analysis of farms in the Bajío: households from farms with higher incomes engaged in a wider variety of non-agricultural waged occupations.

The identification of household size and composition as key variables influencing patterns of wage-labor

migration is an important empirical result of this study, and both conforms to the model of regional labor allocation developed here and emerges as one of the central conclusions in a companion study to the present one (Selby and Murphy, 1980). If anything, the model developed here has neglected an important feedback relationship, that between farm income and household size. In the Selby and Murphy study, urban households engaging in U.S. migration were not the poorest, but it is difficult to tell whether this level of household income is a cause or a consequence of working in the United States. Because farm income is relatively independent of U.S. labor, the fact that U.S. migrants in the Bajío are not from the poorest farms, nor is the Bajío a poor zone, supports the contention that higher levels of household income encourage extended family relationships which permit the riskier alternative of U.S. migration.

3. Following directly from the above analysis, it is clear that migration to the U.S. is not from the poorest zones, nor from the poorest farms within the sending area. In the Bajío, the only major variable which distinguishes households with U.S. migrants from others is household size. Moreover, households with U.S. migrants were grouped by the cluster and discriminate analysis with

the largest category of farms in the area, those engaging primarily in agricultural and diversified wage-labor occupations. Within this relatively developed sending area households of U.S. migrants are representative of the majority of rural landowning households. There is a large "population at risk" for United States migration.

3. IMPLICATIONS FOR PUBLIC POLICY

In terms of rural development, the conclusions of this study are a sword with two edges. On the one hand, capitalist development of agriculture decreases agricultural employment. The landless laborer with no ties to the land is unequivocally hurt by this change. The landed peasant, however, may benefit through higher income if agricultural conditions are favorable. In this case, higher levels of income allow more diverse patterns of wage labor. Whether this labor stays in the local region, or engages in circular migration to nearby urban centers, to Mexico City, or to the United States depends upon the opportunities available in these places.

A program of agricultural capitalization which increases farm income can therefore retain people on the land, but only in the restricted sense of their primary residence. If opportunities for non-agricultural labor within the community are not at the same time made available, the labor freed by changes in crop composition and mechanization may seek work in other places. It appears that rural development policy must encourage the creation of local non-

agricultural employment opportunities, not only in areas where agricultural development is made difficult by physical factors, but especially in those areas where agricultural change is the most rapid.

APPENDIX
THE SURVEY DATA

1. THE BAJIO SAMPLE

1.1 Purpose of the Survey

In 1953 Carlos Manuel Castillo and a group of agricultural specialists began the fieldwork for a detailed study of agriculture in the Bajío, for centuries an important agricultural region of Mexico. After careful consideration, they selected seven municipios in the state of Guanajuato as representative of the zone: Apaseo el Alto, Apaseo el Grande, Celaya, Cortazar, Villagrán, Jaral del Progreso, and Salamanca. Within this survey area, a stratified sample of 405 farms were interviewed from both the private and ejidal sector. From each of these farms, detailed data were collected on farm production and inputs, farm and off-farm labor, agricultural capital, tenure, credit, and characteristics of household members living on the farm. The results were published as an entire volume of Problemas Agrícolas e Industriales de México in October of 1956.

The Castillo study of the Bajío remains one of the classic studies of Mexican agriculture based upon a sample survey. The Bajío, and the seven municipios within it, were chosen in order to closely examine the successes and failures of the Mexican agricultural system, and particularly the unique characteristics of the

ejidal system and how these had affected agricultural prosperity. The years of the thirties and the early forties had witnessed a massive program of redistribution of lands confiscated during the Revolution, receiving its primary impulse from President Lázaro Cárdenas, himself from the Bajío. Miguel Alemán sharply reversed this policy in the late forties, concentrating instead upon industrial production and large-scale irrigation projects to provide the necessities for an urban labor force. By the time of the Castillo survey, each of these opposing forces were evident in the Bajío, and the region represented an ideal microcosm of the two systems of Mexican agricultural production. Castillo's insightful study clearly and dramatically revealed the hardships faced by ejidal farmers and their families, and the dynamic situation in which the two systems were evolving.

I encountered the Castillo study in 1972 during the process of preliminary work for my dissertation in Mexico. The subject I was investigating was the effect of the so-called "Green Revolution" upon agricultural employment. The topic had received a great deal of attention in the literature, but most of the evidence was from areas such as India, which had only recently undergone the introduction of the hybrid seeds that were a necessary part of the Green Revolution technology. This lack of an adequate time frame often led to the use of cross-sectional data to test hypotheses which usually involved dynamic processes. In fact, most of the

potential negative effects of the technology identified in the literature resulted from its "secondary" effects, and were related to the social and economic environment into which it was introduced. The processes from which these potential negative efforts resulted took a long time to work themselves out, and cross-sectional surveys of adopters and non-adopters were clearly inadequate for revealing the effects of their interaction over time.

Mexico, among the lesser-developed countries, had the longest experience with the Green Revolution technology. Norman Borloug had done much of his research on hybrid wheats in Mexico, and they were introduced in Bajío and Northwest Mexico during the fifties. This period coincided with Alemán's push for commercial agriculture and irrigation, and many farms in the Bajío were mechanized during this period. By the mid-sixties, a complex technology consisting of double-cropping, chemical fertilizers and insecticides, hybrid seeds, and mechanization flourished on irrigated land.

My research in Mexico was aimed at determining the effects of this process upon agricultural employment. I had selected the Bajío, rather than Northwest Mexico, because it was a densely populated region which had employed traditional techniques of farming. The Castillo study served as an ideal benchmark survey of the region, taken at the inception of the process of rapid technical change. I located the original questionnaires in a dusty pile behind the xerox machine at the Centro de Investigaciones Agrarias

(in an example of one of those serendipitous aspects of research, the agency did not know of the existence of questionnaires, but Bill Jones, corresponding from the InterAmerican Development Bank, informed me that he had encountered them there several years before). My rediscovery of the questionnaires and their potential for measuring agricultural change interested several groups in participating in a resurvey of the farms interviewed by Castillo, and a project was formed by the Centro de Investigaciones Agrarias, the Comisión Coordinadora del Sector Agropecuario, the Instituto Nacional de Investigaciones Agrícolas, and the Ford Foundation. I was hired as director of this project in June, 1973, relinquishing my fellowship and the immediate goal of my dissertation for the opportunity to obtain a much larger data set than would have been possible alone.

1.2 Fieldwork and Characteristics of the Sample

The unit of analysis for the 1974 survey was the farm plot surveyed in 1954. Thus, if the farm had sold or been divided, the new owner or owners would be surveyed to capture all the land originally surveyed. Of the 322 questionnaires found from the 1954 survey, 259 were surveyed in 1974. The difference was primarily a result of not being able to find the parcel surveyed in 1954 because of lack of a complete identification on the questionnaire, although there was also a reluctance on the part of the larger farmers to participate in such a detailed review of their

agricultural operations. This introduced a bias towards a greater proportion of the sample being from the small farm and ejidal sectors. This bias, and the fact that even if the 1954 survey were representative of the regional distribution of land size the situation would likely differ after 20 years, undermine the statistical representativeness of the overall sample. The conclusions drawn in Chapter VI are explicitly specific to the farm strata from which they were derived.

After a period of review and amplification of the questionnaire and training of the core interview team, fieldwork began in mid-summer of 1974. The core team consisted of me and four Mexican interviewers who had previous experience in field surveys. During an initial period of fieldwork lasting two months, we hired an additional team of ten university students from the region. Permission was obtained from local authorities in the region, and the fieldwork proceeded rapidly during this period. When the fall term at the university began, interviews were conducted by the core team until termination in late fall.

The questionnaire was lengthy and required a minimum of two hours for even the smallest farms. Farmers with extensive holdings, who would provide detailed labor data for each of their crops, would often be interviewed over a period of days for several hours each day. With the exception of a tendency of the farmers in the large irrigated strata to understate their returns, the data are extremely reliable. Besides having the 1954 questionnaire as a

basic check on the size of the parcel, I reviewed each questionnaire thoroughly in the field, performing a series of checks on the consistency of the data and obtaining additional data if necessary.

The time period of the study was the June, 1973 through May, 1974 agricultural cycle. Each crop harvested within the period had associated with it all inputs, including labor, used before the period. Thus, the returns from corn harvested in November would be offset by costs and labor incurred in the April planting. In addition, labor data was collected for crops harvested after the study period, so that a complete distribution of household labor over the year could be obtained. Two overlapping seasonal distributions of labor emerge; that for each crop harvested and that for family and hired labor over the year.

1.3 Data Collected

The data solicited in the interview included the majority of the Castillo questionnaire, which was very complete in most aspects, and an amplification of the section on labor use. The basic questionnaire included data in the following categories: farm size and tenure; production, sales, and inputs disaggregated by type for each crop and product; structure of the family; inventory of capital and animals; non-allocatable costs of production; agricultural practices; and credit. The labor section was amplified to include the number of days worked by the farmer, family members, hired labor, machinery, and animals by crop, month, and activity for each of 27 labor activities. The basic unit of labor

data would appear, for example, as ten days of hired labor used in weeding corn during July. This labor may then be aggregated with other activities and crops to give the number of days of hired labor in July, or with other types of labor to give the total number of days of labor for corn in July, or a number of other combinations. Our experience indicates that this data is among the most reliable in the questionnaire.

Off-farm labor by occupation and month was also collected for each member of the family who worked on the farm during the year. By this means, permanent migrants or circular migrants who did not help with any farm activities (this was rare) did not receive a detailed examination of their labor activities. Besides exceeding the scope of the study, this data would have been unreliable because it was second-hand. Permanent migrants were included in the household only if they sent remittances, and their residence recorded along with other data.

As should be evident from the purposes of the study and the design of the questionnaire, the survey does not deal directly with migration. However, in its detailed examination of labor activities, it does capture circular migration to the United States as one of the activity codes for off-farm labor. Except for jornalero labor, local employment in other activities is not differentiated from circular migration. The location of each household member is obtained in the section on family structure. Thus, while the survey does not adequately capture national patterns of

non-agricultural labor, it does treat U.S. migration in three separate sections: (1) the location of household members; (2) the location of jornalero labor; (3) as a separate off-farm activity disaggregated by month. Were the examination of U.S. labor to have been included as a separate topic, the most valuable addition would have been a survey of the labor activities of household members over recent years to capture previous labor experiences in the U.S. This procedure would without doubt have increased the number of U.S.-migrant households.

Of the 259 farms surveyed in 1974, 41 had to be rejected because of errors introduced in the data tape. The main error was improper aggregation of farms which had divided. There is no particular bias introduced by eliminating these farms with regard to farm size. The resulting sample of 218 farms was the basis for the survey results presented in Chapter VI.

2. THE THREE ZONE SAMPLE

2.1 Purpose of the Study

The analysis of the three zones in Chapters III, IV, and V was based upon subsamples of questionnaires from a survey of farm employment by the Centro de Investigaciones Agrarias (CDIA). This was a three year project which surveyed six zones in Mexico with divergent characteristics in order to examine the extent of under-employment and unemployment in Mexican agriculture. The results were published in three volumes (Barbosa-Ramírez, 1976; 1977; 1979).

The Centro de Investigaciones Agrarias has a twenty-five year history as an independent research organization studying Mexican agricultural problems. Its most ambitious project was a survey of Mexican agriculture and an analysis of the data collected by respected authorities in Mexican agriculture, the results of which were published in 1974 in Estructura Agraria y Desarrollo Agrícola en México. President López Portillo recently recognized its contribution by making it the Centro Nacional de Investigaciones Agrarias.

The project which resulted in this report was initiated in October, 1978. Budgetary constraints made it necessary to use existing data, though it was clear that secondary data was usually too aggregated to be of much use for the approach which I was exploring. A preliminary visit to Mexico was undertaken to examine existing sets of survey data which would be available and useful for the analysis of migration. This visit resulted in an agreement with the CDIA to utilize the data collected in their employment survey.

1.2 Selection of the Zones and the Subsamples

For the purpose of its survey of agricultural employment, the CDIA chose six agricultural regions of Mexico. From these six, I eliminated three: Toluca, because there was insufficient data on migration; Las Tuxtlas, because it bore resemblance to Las Huastecas, yet was much farther from the United States; and

Hermosillo, because data was not collected by household, but rather by a concept relating to water rights.

The three zones chosen for further analysis--Las Huastecas, San Luis Potosí; Valsequillo, Puebla; and La Mixteca Baja; Guerrero--are similar in that each is a zone of peasant agriculture. In each farms are small, production for household consumption is important, the use of purchased inputs is low, and household members find it necessary to work off-farm to supplement farm income. However, as demonstrated in the body of this report, there were important differences among the zones with respect to their agricultural systems and types of off-farm employment.

Subsamples were selected randomly from each of these CDIA samples. A subsample size of approximately 100 was chosen to correspond to the smallest CDIA sample of the three, which was 93 for the Mixteca Baja. Thus, the sample of 299 farms in Valsequillo and 480 farms in Las Huastecas was arranged by categories of farm size, and subsamples of 99 and 98 farms, respectively, were chosen randomly within farm size categories according to the relative weights of each farm size in the regional sample. Not all of the questionnaires in the Mixteca Baja could be found, and a smaller subsample of only 67 farms resulted.

Approximately 100 items of data were taken off each questionnaire. Data relating to migration and employment was taken in the most disaggregated form available, while summary values for items such as farm income by crop and capital inventory were used.

These items were copied from the questionnaires onto accounting sheets by CDIA personnel, mailed to the Institute of Latin American Studies, and there punched on cards. The analysis was done at the University of Texas using the Statistical Package for the Social Sciences (SPSS) and a special program for cluster analysis (Uebersax, 1978).

Transmittal of the survey data was only one aspect of the collaborative relationship between the CDIA and the Institute of Latin American Studies. In December, 1979, Gustavo Treviño and I visited the three survey zones with an investigator from CDIA. Armed with the CDIA analysis of employment in these zones and personal experience in other zones, we were able to gain first-hand knowledge of the salient characteristics of each region. In this and other visits to Mexico, valuable comments on research design and theoretical perspective were incorporated into the project.

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